# ELECTRIC RAILWAY JOURNAL

SEMINARY ROOM
MECHANICAL ENGINEERING DEPARTMENT

Volume 44, Number 17 McGraw Publishing Co., Inc. New York, Oct. 24, 1914

**One Lesson of the Convention**

Satisfactory public relations hinge upon satisfactory service. Satisfactory schedules are the vital part of satisfactory service. You can't maintain schedules if you can't depend upon your motors. You can't depend upon your motors unless they are equipped with dependable brushes.

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Learn all about the low cost per car mile effected by this method.

**The Morgan Crucible Co., Ltd.**
**114 Liberty St., New York**
**Factory, Brooklyn, N. Y.**

# *Home Again from the Convention*

"JOE," said the General Manager to the Superintendent, "I am very glad we attended this convention. The business situation kept a number at home, nevertheless, it was the best convention we ever held. There was a great display of interest at all the meetings and the exhibits were all good, but, say Joe, when it comes to showing things of real interest to the railways, the Westinghouse Companies were so far ahead of the others there really was no comparison. The Westinghouse Companies were commended by many for their exhibits, and especially for taking us into their confidence and showing the new **Pressed Steel Motor** which they are going to try out during the year."

"There is no use talking, Boss," answered Joe, "the Westinghouse people are a live bunch. Every one of their engineers and factory men, I met there, know the things we are up against nearly as well as we do. No wonder they put it all over the rest."

"That's a fact, Joe," said the General Manager, "that Condenser Type Lightning Arrester, the Improved Line Material, the Switchboard Panels, the Turbine Set, the Improved Control and Motors, all go to show that what you say is true, and it means that we know who to look to when we want additional equipment."

## Westinghouse Electric & Manufacturing Co.

Sales Offices in
45 American Cities

East Pittsburgh
Pennsylvania

53

# Electric Railway Journal

*New York, October 24, 1914*

Volume XLIV No. 17

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# Turbines

**The most progressive power plants in all parts of the world contain Westinghouse equipment.**

One of eight units in the plant of the Osaka Electric Light Co., Osaka, Japan.

**The Westinghouse Machine Co.**
Prime Movers & Auxiliaries
East Pittsburgh, Pennsylvania.

# Electric Railway Journal

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**THE BASIS OF OPTIMISM**

In an interesting interview, published elsewhere in this issue, H. Hobart Porter points out the relation between the industrial situation and the gross earnings of electric railway companies. These have not shown as great decreases in business caused by the war as the steam railroads, and this comparative stability of earning power, as Mr. Hoyt, of N. W. Halsey & Company, pointed out in our issue of Oct. 10, constitutes one great merit of electric railway securities in the eyes of bankers. The general economic situation, however, is improving. Already the West is beginning to feel the benefit of the export sales of grain, negotiations are reported from Washington looking toward the marketing of a large part of the cotton crop, and large foreign government orders are stimulating individual industries throughout the country, particularly among the textiles and some branches of the machinery trade. The electric railway companies should soon begin to feel this revival of business. Their normal annual growth of traffic, excluding that from any extensions, is about 5 per cent, and if there has been a setback in this increase during the last few months it ought to be added to the normal growth with the general revival of business. This country is not in a critical financial condition. It is producing in abundance the primary necessities of life, and general business should rapidly approach its normal footing with the clearing up of the banking situation, which should not long be delayed.

**THE SOPHISM OF LOCAL CONDITIONS**

In discussions at gatherings of street railway operators, where practices are compared either informally or on the floor of the convention, one constantly hears the phrase "local conditions." This expression is used to justify or explain some practice in vogue that is divergent from generally accepted standards. It applies particularly to transportation questions although unusual designs of car bodies apparently are often explained by the same phrase. Frequently it will be found on investigation of the factors involved that there is no fundamental condition or compelling reason for divergence from generally accepted practice, and it is difficult to avoid the conclusion that a lack of discriminating analysis and a near approach to provincialism is indicated when an operating man allows himself to drift into the state of mind where such a vague generality is submitted as logic. When the phrase "local conditions" is advanced as a reason or an explanation, the person to whom it is addressed should not accept it as adequate without himself weighing all the influencing factors and drawing his own conclusions as to its adequacy. As an excuse for moribund practices or for the magnification of petty detail it has been done to death.

**TROLLEY FREIGHT TO PUBLIC MARKETS**

At this time a strong effort is being made by the New York City administration to establish a large number of public markets in order to lower the cost of living. One suggestion which is being considered with favor is that the electric railway be utilized to bring farm produce to the city. Electric freight would be a novelty to New York, although the Brooklyn Rapid Transit System once had a fleet of refuse cars under municipal contract and also a number of express cars for one of the old-line companies. The Brooklyn company now conducts a large electric freight business, but this is chiefly in connection with dock shipments and not with outlying truck farms. Public sentiment in New York hitherto has not favored the extended operation of trolley freight on the grounds of unsightliness and noise. It is difficult to see, however, the propriety of this criticism. If the freight was not taken through the streets by car it would have to be carted over the same streets in a larger number of much noisier trucks, and the cars make no use of the street pavement which the trucks wear out rapidly at the expense of the taxpayers. Finally, such a car service need not interfere with the busiest city schedule since produce cars going inward would naturally be operated only during the very early morning hours, while they could be returned during any of the slack hours of the day. The present is therefore a favorable moment for the electric railways in and about New York to follow the example set for years by the Western interurbans in inaugurating and building up a service that will earn good profits and the gratitude of the ultimate consumer.

**DISCIPLINE OF RAILWAY RECRUITS**

An easy-chair reading of the recent convention discussions at Atlantic City will bring to light many valuable ideas for the electric railway operator, but none of greater worth than that of recruit discipline as practiced on the Syracuse properties of the New York State Railways. It has been so long the custom to place all platform men on the same basis of discipline regardless of their experience that any move toward a preferential system may seem revolutionary. It is revolutionary openly to acknowledge and practice such segregation, yet he would be a poor superintendent in-

deed who did not discipline a new man with less rigor than a hardened offender. However, the policy described by Mr. Duffy is commendable in treating the matter of discipline according to sound pedagogical principles. In Syracuse it is not the superintendent who is the disciplinarian for the hundred and one minor infractions which the novice commits during his first six months, but the instructor, the same man who had lately released the student as fit to operate a car. This plan is one that "blesses him that gives and him that takes." The superintendent gives up a part of his prerogatives, but in exchange therefor he is relieved of the disagreeable task of teaching a man what he ought to know when he leaves the care of the instructor. The instructor, on the other hand, can do better work because he knows where his teaching has failed in practice. Another advantage is that the instructor remembers the degree of aptitude and willingness shown at school by the novice, whereas every green motorman or conductor is practically a stranger to the superintendent. Thus the Syracuse system is a frank acknowledgment that the instruction of a platform man matures in the responsible handling of his car and not in the classroom.

## DRAINAGE AND TRACK FOUNDATIONS

The report on proper foundations for track in paved streets, as submitted by this year's way committee, is one of the most valuable contributions with which the industry has been favored in recent years. Anyone who has had occasion to compare the different types of track foundation used in this country will readily realize the great variation in foundation design installed to perform practically the same service under the same conditions. All of these cannot be the best, and the committee's study should help greatly to bring about standardization, or at least greater uniformity, in this important branch of electric railway engineering. While it appears unfortunate that the rules of the standards committee did not permit the Engineering Association to accept the four recommended track designs other than as "information," the present enormous diversity in foundation conditions probably made any other course impracticable.

We have no doubt that some track engineers, conscious of their own peculiarities of soils, grades, rainfall and other conditions, may take exception to certain individual features in the proposed sections. Perhaps the greatest degree of dissent will arise in connection with the underdrains suggested for types *C* and *D* concrete foundations. Undoubtedly in these types the bearing power of the subsoil is not so likely to be affected by water because the ties are completely surrounded with concrete and the subgrade would also be filled with practically waterproof material. But in type *C* construction, certainly, we believe that seepage from the pavement surface should definitely be cared for. This can be done by providing weepholes with outlets to a sewer system so that they will not drain into the subgrade. Otherwise water from higher ground near by might back up to the subgrade and cause the tracks to heave in freezing weather. Doubtless one reason why the committee showed underdrains for concrete constructions was to provide for those cases where the heavy absorption of water by the soil would leave the subgrade resting on a precarious foundation.

As to the types *A* and *B*, or the ballasted constructions, we believe that it would be practically impossible to eliminate water from them unless underdrains such as the committee suggests are provided. If this was not done, the entrance of seepage water would carry silt into the voids of the ballast from the sides and bottom of the subgrade, and this silt, in time, would reduce the bearing power of the ballast.

These, however, are matters of detail upon which there may be a legitimate difference of opinion. The committee may rest content in the knowledge that it has given the fraternity a set of designs which represent a big step toward the ideal track.

## MODERN CAR LIGHTING

The discussion on car lighting which was held at the Oct. 14 session of the Engineering Association, revealed clearly that the days of the bare filament lamp are numbered. So long as only the comparatively inefficient carbon lamp was available for car lighting the number and candle-power of the units necessarily was limited for economic reasons. The initial effect of the introduction of the more economical tungsten lamp was simply the substitution of tungsten for carbon bulbs in the same sockets except that the new units were of greater capacity. It soon became evident, however, that more light was by no means synonymous with better light, because the bare filament tungsten lamp proved too dazzling to the human eye. In fact, where the car finish was a pure white, the very reflection of the lamps proved fatiguing. After the general use of the tungsten filament had made the question of energy consumption of relatively less importance a number of companies began to experiment with the use of reflectors to see whether car lighting could not be made as agreeable as the illumination of rooms in a stationary structure.

These pioneer attempts, begun little more than two years ago, soon brought out the fact that the manufacturers would have to develop lighting fixtures suitable for at least two conditions incident to car operation, namely, breakage from vibration and security against robbery. Apparently these conditions have now been met to a degree which is great enough to justify serious consideration of reflector lighting by electric railways generally. There is still a division of opinion with regard to the number and capacity of units, some favoring say sixteen 23-watt lamps and others preferring one circuit of 94-watt units. Both parties are agreed, however, that reflector lighting makes a light interior car finish more instead of less agreeable to the eye and that it produces appreciable economies in the initial lamp capacity. As one of the speakers intimated at the discussion, it is now incumbent upon the electric railway to abolish the bare filament lamp before any serious agitation on the subject is stirred up by civic betterment organizations.

### ZONE FARES IN MILWAUKEE

City systems which are face to face with the problem of the increasing cost of transportation and the diminution of the 5-cent fare will find a possible solution in the paper by Mr. Stearns elsewhere in this issue. This paper was presented at Atlantic City last week, but on account of the time necessary to reproduce the illustrations its publication was postponed until to-day. The problem initially in Milwaukee did not differ from that in most American municipalities. It is one which is bound to arise as the result of the growth of every city, the consolidation of its surface railways and the extension of the 5-cent fare to all points within the city limits. This is a common condition, and in cases of this kind there are certain to be apparent discriminations in fare within the single-fare district. These discriminations can easily be found, as Mr. Stearns says, by the use of a ruler and a map, and they necessarily result in complaints and demands for lower fares from those outside the 5-cent limit who think they ought not to be obliged to pay two fares when other sections are receiving as long or a longer ride for a single fare. Such demands sound plausible when considered by those who do not realize that the system of fares in use is a somewhat chaotic development and inheritance from previous days. At the same time, when these demands are backed by real estate promoters who care nothing about the financial welfare of the railway company but only want the lower fares to help them sell lots, they constitute a serious menace not only to the railway company but to the character of service which that company can give to other sections of the city.

This, in brief, was the problem presented to The Milwaukee Electric Railway & Light Company and the Wisconsin Railroad Commission, and the answer in that case was the zone system described by Mr. Stearns. This system retains for the metropolitan district the basic 5-cent fare but provides for additional fares of 2 cents for zones or belts outside of the central district. The latter does not correspond with the corporate limits of Milwaukee but is an area of 8 to 9 miles in length and 6 miles in width. The introduction of this system necessarily increased some fares, even within the city limits, but not, of course, to the extent of another nickel, and on the whole it has given entire satisfaction to the public. This fact is evidence of the contention sometimes made that long distance riders on a city system will not seriously object to a fare corresponding to the length of their ride, provided other parts of the city are not on a very different basis. In its practical application the zone system necessarily involves complications in fare collection, but these seem to have been carefully worked out in Milwaukee and to be simple of application by both the public and employees of the railway.

The financial statements presented by Mr. Stearns show that even with this increase in fare the suburban lines at Milwaukee as a whole are not profitable. This also is undoubtedly a general condition. But if a city system is fairly profitable and the community is growing, a railway company can carry a number of slightly unremunerative suburban extensions in the hope that they will develop later into profitable feeders.

We are glad to see such an interesting departure from standard American practice in fare collection set forth with so much detail as in Mr. Stearns' paper. It holds forth a great deal of promise for many American localities. A large number of states now have commissions with powers over rates as great as those possessed by the Wisconsin commission, and there would seem to be no legal objection in most instances for an application of this remedial measure elsewhere.

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### BIG WHEELS NEEDLESS ON TRAILERS

The prominent display of dwarf-type railway motors at the last convention of the American Electric Railway Association was a strong demonstration of the faith which the manufacturers now have in the permanence of a design that but lately was classed as a freak. It is evident also that the progressive electric railway operator is prepared to encourage the efforts of the manufacturers, if we are to judge by the adoption of this new motor by such roads as the Mahoning & Shenango Valley Railway, the Third Avenue Railway, New York, and the United Railroads of San Francisco. The last-named company went to the trouble of making extended tests, as detailed in our issue of Aug. 8, and secured very favorable results in the saving of energy by substituting dwarf motors with 24-in. wheels for old motors with 30-in. diameter wheels. At the same time, of course, a substantial reduction in step height was attained.

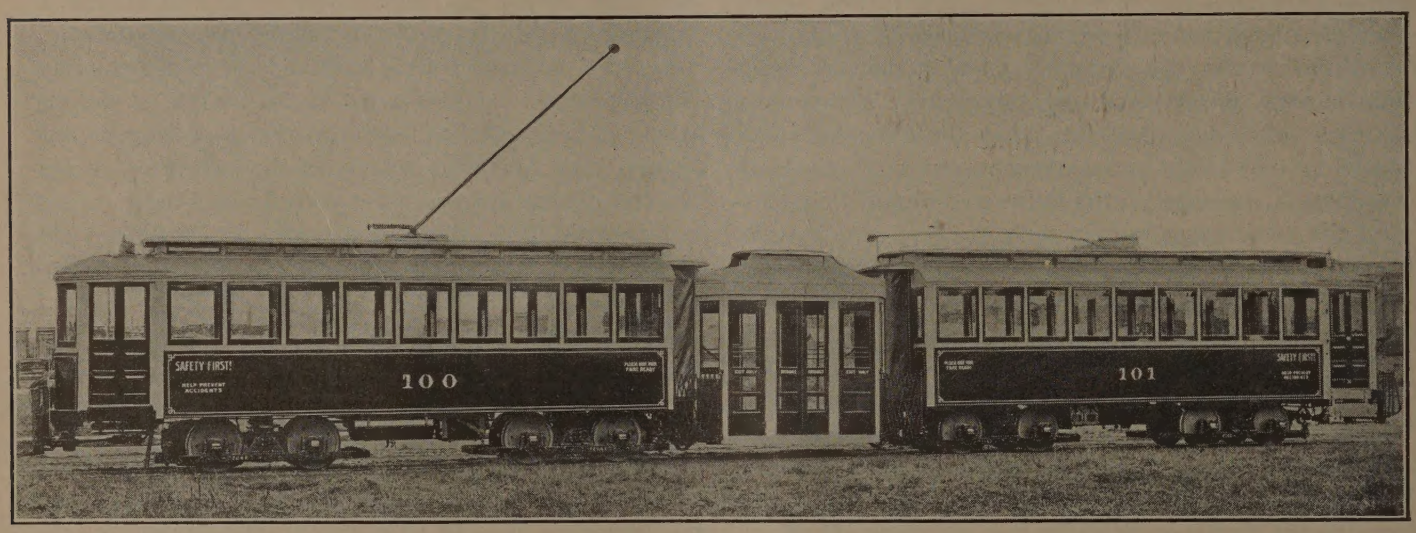
These cases are mentioned to show that other companies are finding the Pittsburgh low-wheel idea perfectly feasible for their motor cars, yet some very recent orders for cars otherwise modern show that the adaptability of the small-wheel principle even for trailer service is not widely appreciated. So far as motor cars are concerned, it is to some extent understandable why the ultra-conservative operator should stick to the big wheel and big motor. Perhaps he does not think it worth while to depart from present standards for the sake of a small fraction of new cars; or he may feel that the maintenance reliability of the dwarf motor over, say, five years is still an uncertainty. But such reasoning does not apply to the operator who is beginning the use of trailers. His very success in trailer operation will depend upon using a light and inexpensive car that permits rapid and easy exit and entrance. Therefore, he must not consider his trailer primarily as a car which could go into motor service but rather as a special design for a special purpose. To use big wheels, and consequently a high step, in a car which has no motors is to misunderstand the trailer situation completely. The location of draft rigging on the cars of the train offers practically the only mechanical problem and this is a small one indeed, compared with the juggling that has been required to lower motor car steps 3 in. or 4 in. Where so much ingenuity has been applied to the steps of the motor car, it is not unreasonable to expect the trailer to be a low-floor car as a matter of course.

# Twin Cars in Portland, Ore.

Several Cars of the Articulated Type Have Been Placed in Service in This City—They Are Built from Old Double-Truck Cars of Small Size and Provide Units Seating Sixty-Four Passengers

The Portland Railway, Light & Power Company, Portland, Ore., which is managed and operated by E. W. Clark & Company, Philadelphia, is having much success in the operation of its new "twin cars." These cars, rebuilt from the old high-step trolleys, follow, in a general way, the articulated type of car used in Boston, with this principal exception: the Portland cars utilize two double-truck car bodies, whereas those in Boston use only single-truck cars. Complete separation of incoming and outgoing passengers is effected and a double interlocking system of signals between conductor and motorman has been introduced.

The objects sought in the reconstruction of the smaller units into "twin cars" may be summarized as follows: to utilize effectively and profitably the heavy investment in small cars of low carrying capacity; to obtain a unit which will hold a large number of passengers, thus reducing the number of cars operated during the rush periods; to reduce platform cost where two-car trains are now operated; to extend the prepayment feature to cars not so designated, and to reduce accident risk.




TWIN CARS IN PORTLAND—GENERAL VIEW OF CAR READY FOR SERVICE

## Structural Details

The "twin car" consists of three compartments, of which the two end sections are 34-ft. 6½-in. cars with one vestibule and platform removed from each, and the middle section is the suspended platform for the two cars. This middle section acts as a flexible connection between these two cars and is used only for entrance, exit and fare collection. The conductor is stationed in this middle compartment, hence the advantages of the center entrance prepayment type of cars are obtained. No trucks are under the center compartment, and therefore but one step from the street into the car is required.

The length over bumpers is 73 ft. 4 in., the middle section being 12 ft. center to center. The equipment consists of four GE-58 motors, with K-6 controllers and GE emergency air-brake equipment. The floors of the two end cars are 36 in. above the rail, and this distance is divided into three steps, the first, of 14 in., being from the street to the main floor of the center compartment, the second, of 12 in., to a platform on either end of this middle section, and the third, of 10 in., comprising a portion of the pivotal connection between the compartment and the car body. The last step is circular and built on the center sills of the original platform. When the car takes a curve this step rotates over a circular toe-board rising from the 12-in. platform of the middle section. Sufficient clearance is provided between this toe-board and the circular step, and free rotation is afforded, thus forming a perfectly safe and comfortable passage even on the sharpest curves.

The center compartment is carried on a steel underframe pivoted on center bearings, supported both by the lateral sills extending from the car body and by a center pin pendant from a bearing rigidly fastened to the original platform sills. Roller bearings on the steel underframe are set on radial side bearings under the circular step.

Double curtains on spring rollers inclose the passageway between the middle and end sections. The inner curtain, of pantasote with cloth lining exposed, clears the floor by several inches and reaches only shoulder high. This curtain can easily be removed for cleaning. The outer curtain of 12-oz. waterproof canvas extends from below the circular step level to the ceiling.

The roof section of the pivotal connection is hinged to the transom of the center compartment and bears on the transom roof of the end section. This permits carrying the roof line of the car bodies through the middle section and thus suggests the appearance of a center entrance car. This effect is increased by life guards pendant from the ends of the car bodies and dropping from the side sill level to the level of the bottom sill of the center portion. Pantograph gates are supported in brackets between the compartments.

The steel underframe consists of a set of four 5-in. channel irons extending the full length of the center section. The ends of these beams are supported by the upper center bearings, and their middle portion is shaped by reverse curves at either end so as to drop below the floor level. The side sills are 4-in. x 4-in. angle-irons, spaced the width of the center section apart. Their ends are bent inward and upward to connections on the chan-

nel irons and form the end sills of the middle section. The side sills are 1 in. below the level of the center sills and form a convex ramp laterally through the center compartment. Diagonal braces, from corner to corner, and lateral end braces with side end truss members complete the underframe.

### ENTRANCE AND EXIT FACILITIES

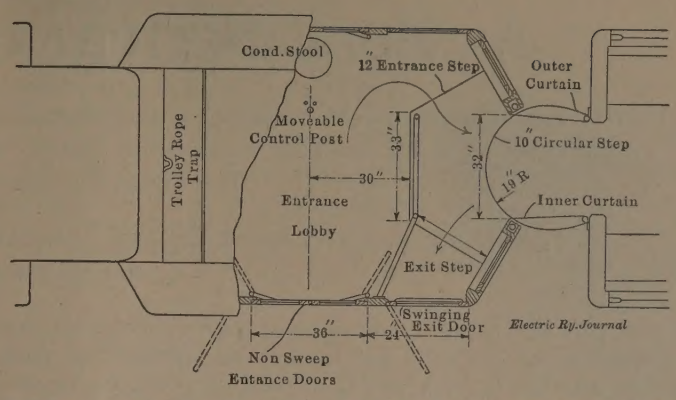
A pair of center entrance doors are adjoined by exit doors on either side. The entrance doors are of the "non-sweep" type and are hinged in the center on a pivot, the movement being controlled by a roller on the outer edge which runs in a slotted guide-way above the doors. The exit doors are of the simple swing type with check. The conductor's station is opposite the entrance doors behind a movable post. A permanent barrier at the end of each the platform steps and movable barriers between the entrance and exit doors separate the streams of entering and leaving passengers. The entering passengers cross the center section and pass the conductor on either side before reaching the platform step.

The fare-registering and door-operating devices are mounted on the above mentioned movable post, as are also the conductor's stool and bell cord signal to the motorman. This post is shifted to the opposite side of the compartment when the direction of the train is reversed. All connections are automatically made when the post is placed in position. This is accomplished by a set of plugs entering sockets in the floor and overhead rods. Three hand levers and a pedal mounted on this post control the entrance doors, the exit door, the register shift and the register respectively. Overhead rods connect the doors and register with the post. The entrance doors are opened and closed by the conductor. The exit door is unlocked and locked by the conductor, but must be pushed open by the leaving passengers. A small electric light in each motorman's cab is connected in a circuit which is only completed when the entrance and exit doors are closed and locked. As a double precaution against boarding and alighting accidents, the bell cord signals, by a ball and tube mechanism attached to the door operating devices, are locked to prevent possible signaling unless the doors are closed and locked.

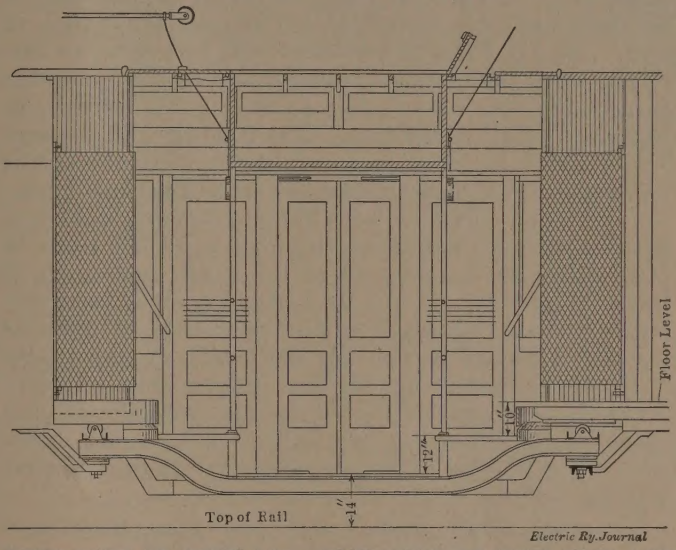
The trolley poles are carried through a slot in the ventilators on either end of the center section. Trolley catchers are used. An emergency valve, which can easily be operated by the conductor, enables the latter to apply the air brakes independent of the motorman in case of emergency.

The motorman has exclusive use of the end platform and door. A movable seat on the rear end locks the door and, with its opposite stationary seat, increases the original seating capacity of the train by four passengers; thus making the total seating capacity of the "twin car" sixty-four. There are at present four of these cars in operation.

TWIN CARS IN PORTLAND—VIEW SHOWING EASY ENTRANCE FACILITIES




TWIN CARS IN PORTLAND—PLAN OF VESTIBULE SHOWING ARRANGEMENT OF EQUIPMENT




TWIN CARS IN PORTLAND—ELEVATION OF ENTRANCE AND EXIT VESTIBULE

For subsequent cars which are now under construction in the company's shops a number of changes are to be made in order to improve the external appearance, but the general construction of the new cars will be identical with those first built. The principal change will be the carrying of the roof line of the two car bodies through the middle section, this being planned for the sake of appearance.

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The engineering experiment station of the University of Illinois has issued a bulletin entitled "The Thermal Properties of Steam," No. 75 in the series. It was prepared by C. A. Goodenough and presents a critical discussion of the experimental investigation of the various thermal properties of steam, an outline of the thermodynamic relations that must be satisfied, and the development of a general theory of superheated and saturated steam. It is believed that this formulation of the properties of steam give absolute thermodynamic consistence, extreme accuracy, simplicity, flexibility and great range of validity. Copies of the bulletin may be obtained without charge from C. R. Richards, acting director of the experiment station, Urbana, Ill.

# A Zone System of Fares in Practice*

This Is a Comprehensive Description of the First Extended Application in This County of the Zone System of Fares for City Lines—Full Detail of Earnings and Expenses Are Given—Data from European Cities Are Appended

BY R. B. STEARNS, VICE-PRESIDENT AND ASSISTANT GENERAL MANAGER THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

A zone system of street railway fares and collections applicable to suburban and interurban territory in place of the nickel system almost universally used in American cities and suburbs has been placed in operation during the last year on the urban, suburban and interurban lines of the Milwaukee company. The system to be described is a practical attempt at the fixing of street railway fares so that they will vary more or less closely with the distance traveled and in some respects is not unlike the zone system on the electric railways of England and the Continent. The treatment in the central district, however, is substantially different and is necessarily so in order to accord with American conditions. While fares so fixed are not exactly in line or parallel with the cost of service, they are quite likely to prove more so than flat fares for longer zones. It is believed that this is the first attempt on a relatively large scale to introduce small increments of distance traveled for small increments in the way of added fare.

While the system may at first appear complicated in operation, in point of fact it is relatively simple, and predicted difficulties of fare collection have not developed. The general scheme was referred to in President Harries' address at the 1913 convention.

## The Milwaukee Railway System

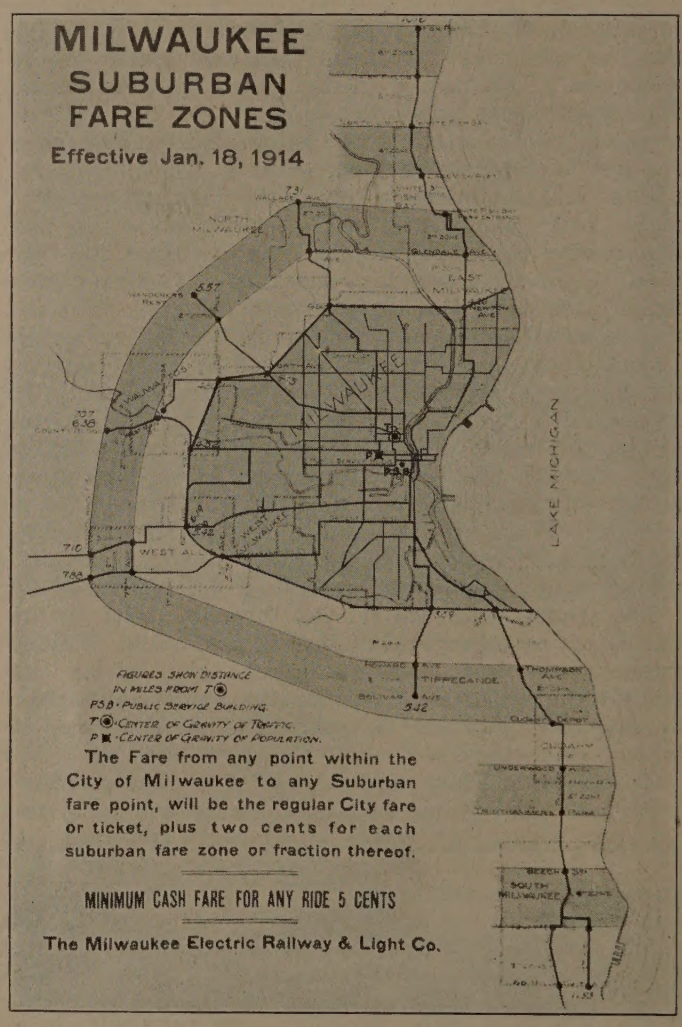
The Milwaukee railway system comprises 417 miles of surface tracks, of which 175 miles are located in the city of Milwaukee, 60 miles serve the suburbs of Milwaukee, 20.5 miles comprise the local system in the city of Racine, and the remaining 161.5 miles are essentially interurban. The interurban tracks extend southward 37 miles to Kenosha, passing through several municipalities, including Racine, which has a population of 40,000. They also extend 51 miles to the west, passing through the cities of Waukesha, Oconomowoc and Watertown, and 37 miles to the southwest, passing through Hales Corners, St. Martins and East Troy, with a branch line from St. Martins through Waterford and Rochester to Burlington. On the entire system there are operated 686 passenger cars, carrying about 150,000,000 passengers per annum.

## Former Rates of Fare and Distances

The fare charged within one fare limit of Milwaukee is 5 cents cash, six tickets for 25 cents, twelve tickets for 50 cents, and twenty-five tickets for $1. Each of the latter two classes of tickets have coupons attached which will be accepted in payment of one fare within the city of Milwaukee fare limits, if the order of the Railroad Commission, providing for the sale of thirteen tickets for 50 cents is set aside or vacated in the action now pending. About 81 per cent of revenue from urban traffic is paid in tickets.

Prior to Jan. 18, 1914, the rate of fare beyond the single-fare limits of Milwaukee was 5 cents cash into and through each 5-cent zone, these 5-cent zones having been fixed in previous years by franchise negotiation, trade or voluntary concession and extended through each suburban city or village adjacent to Milwaukee and on the interurban lines beyond. The distances for a 5-cent fare varied from 0.99 to 7.17 miles and were the sources of many complaints. Overlapping fare zones had grown into the system from time to time, due to extension of the city fare limits, annexation of territory, compromise, franchise provisions, etc.

On certain suburban lines reduced rate commutation bearer tickets were sold in blocks at 7½ cents each. These were good for a ride in either direction in the city of Milwaukee, including one 5-cent suburban zone adjacent thereto.


MILWAUKEE
SUBURBAN
FARE ZONES
Effective Jan. 18, 1914
LAKE MICHIGAN
FIGURES SHOW DISTANCE IN MILES FROM T
P.S.B.-PUBLIC SERVICE BUILDING.
T-CENTER OF GRAVITY OF TRAFFIC.
P-CENTER OF GRAVITY OF POPULATION.
The Fare from any point within the City of Milwaukee to any Suburban fare point, will be the regular City fare or ticket, plus two cents for each suburban fare zone or fraction thereof.
MINIMUM CASH FARE FOR ANY RIDE 5 CENTS
The Milwaukee Electric Railway & Light Co.

MILWAUKEE ZONE SYSTEM—MAP SHOWING ZONES

The fares charged on the interurban lines were made up by the sum of the various 5-cent zone fares, plus the Milwaukee single fare, transfers and reduced rate city tickets being exchanged for that portion of the ride in Milwaukee from the first fare point to the Public Service Building, located within the business district. Reduced rate round-trip tickets were sold to certain interurban points. The relation between the round-trip rate and the one-way rate was not uniform

*Paper presented at convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 15, 1914.

but varied according to the circumstances which the fare was designed to meet.

### COMPLAINTS REGARDING DISCRIMINATIONS IN FORMER RATES AND DISTANCES

With the advent of commission regulation, many complaints were made by patrons and municipalities, alleging discriminations, citing the various instances of disproportionate distances for the same fare, urging extension of single-fare limits and round-trip reduced rates comparable with those in existence on other parts of the lines, etc. Cases had been brought before the commission involving the extension of the Milwaukee single-fare limits to two of the principal suburbs, and a number of other cases were pending, all of which gave evidence of continued controversy and involved much time and expense on the part of both the company and the commission.

Abundant opportunity existed for complainants to present a plausible case. All that was necessary was a diligent search with ruler and map to discover instances where the company was giving longer rides for the same money and then to argue that the complainants were either paying too much or received less favorable treatment and hence were discriminated against. The single-fare zone does not in several instances correspond with the corporate limits of the city. In one case many years ago, real estate owners desiring to subdivide land for sale at a profit undertook to raise $30,000, and actually paid over $20,000, as a subsidy to procure the construction at that time of an extension of one city line some 3 miles into the country, with the apparent understanding that city service at the single fare be extended to the outer terminus. These hopes of rapid development were not realized, and operating deficits still continue to exist due to sparsity of traffic. This condition gave rise to recurrent demands for lower fares from other suburbs. In other cases, franchise conditions inherited in many cases from predecessor companies prescribed fare zones, which gave equal possibilities of unfavorable comparison.

These existing conditions were in their nature beyond the control of the company. Its only defense, aside from considerations of density of traffic, was the very evident fact that the instances cited were not paying expenses. Public policy and the best policy of management required that inequalities be eliminated and that a new uniform system of fares based as far as possible upon scientific principles be substituted for the prevalent system of fares.

Accordingly, in conformity with the suggestion of the Railroad Commission of Wisconsin, the company made formal application, under date of Aug. 15, 1913, requesting that the commission "investigate the rates for suburban and interurban service and by order prescribe such uniform tariffs and schedules of rates as shall be just and proper under the circumstances." All the various cases and petitions before the commission involving reasonableness of the alleged discriminations for suburban and interurban service were consolidated and disposed of in the decision of Jan. 2, 1914. A few citations from the opinion upon the points involved will be of interest.

### CITATIONS FROM DECISION

*Discriminatory Features of the 5-Cent Zone.* "In selling transportation to persons the adopted standard unit of measurement is the passenger-mile—one passenger carried one mile. Although steam lines in general have adhered to this standard, the electric interurban system in many cases have used the so-called 5-cent zone system of rates. This system is merely an extension of the flat 5-cent city fare and has no scientific basis for suburban or interurban operation. The resultant inequalities which exist under this system of rates may well be illustrated by measuring the different fares charged by the unit of measurement—the passenger-mile. No better examples can be cited than can be found upon the suburban and interurban systems involved in the present proceeding."

*Discriminatory Features of Overlapping Zones.* "Directly due to the inequitable nature of the 5-cent zone system, as outlined in the * * * discriminations of one-way fares, is the practice of granting overlapping zones, special and round-trip rates to favored points. When overlapping zones are injected into the 5-cent zone system we have a rate scheme which places every locality in competition with its neighbors. For instance, it is usually contended that if a company extends the limits of an interurban zone for ½ mile so as to reach a certain locality, and thereby grants a lower fare to this locality to all points through the overlap, it logically follows that the next locality ¼ mile or ½ mile distant should be granted a similar concession. The result is that this necessity of granting overlaps caused the rate schedules to become even more discriminatory, and, carried to its logical conclusion, the entire schedule ultimately must fall to the ground.

"In any equitable system of fares for suburban and interurban service the overlapping zone cannot be justified except under very extreme conditions."

*Necessity of Uniform Distance Basis for Fares.* "In establishing a revised system of interurban and suburban fares it is fully realized that the present fares will be considerably disturbed in some sections of the territory, but this is not due to the application of any radical or untried theory of rates. It is due principally to the fact that the existing fares * * * do not rest upon any scientific basis but are based upon unequal zone distances and concessions to favored localities. The results of such a schedule are obvious. Invariably one or more localities are built up at the expense of others. Patrons favorably situated are granted extremely low fares, part of the cost of which has to be borne by those less favorably situated and paying excessive rates. With these facts in mind, a revision is here undertaken with the sole aim of removing as much of the discriminations as possible and placing a schedule of fares in force, upon a uniform rate per passenger-mile, which will equalize opportunity for local growth and expansion, insure equitable treatment of individuals and reasonably reserve the amount of traffic upon the various lines."

*Basis of Zone System of Fares.* "In bringing about uniformity in the suburban fares by applying the distance basis * * * the fares as authorized are placed as near as possible upon an equitable basis by the establishment of consecutive 2-cent zones. * * * This scheme of fares is far less discriminatory than the existing 5-cent zones with the accompanying overlaps. The present system is discriminatory partly because the suburban zones vary all the way from 1.44 miles to 7.17 miles. * * * When cognizance is taken of the fact that 5 cents is charged for these varying distances the inequalities as between suburbs becomes apparent. * * * To remedy these differences it will be necessary to employ shorter zones upon a proper basis. A charge of 2 cents as applied will necessarily raise the low rates and decrease the higher ones."

These changes were immediately made effective upon the entire system with the exception of the longest suburban line, where a reduced trip ticket with an increase of 2½ cents over the present cash fare and 3½

cents over the suburban cash and city ticket fare has been installed for a period of one year in order that the transition to an increased fare operate gradually.

### PRESENT SYSTEM OF ZONE FARES—UNIFORM FARES AND DISTANCES

The system of fares established in compliance with the opinion and decision of the commission comprises a "Central" or "Metropolitan District," extending 8½ miles to 9 miles in length and 6 miles in width, bounded on one side by Lake Michigan; the area aggregates approximately 35.5 square miles and contains a population of 400,000. The Metropolitan District conforms substantially to the area within the then city limits, the corporate limits, however, being disregarded as controlling. Within the boundary of the Metropolitan District a single fare is charged irrespective of distance carried. The length of the various lines radiating from the center of gravity of the street railway traffic in the downtown district to the outlying territory and beyond the Metropolitan District into the suburbs, is as shown in Table I.

TABLE I—DISTANCE IN MILES FROM CENTER OF GRAVITY OF TRAFFIC

| | City Portion | SUBURBAN PORTION | | | | | Total Suburban | Total |
|---|---|---|---|---|---|---|---|---|
| | | First Zone | Second Zone | Third Zone | Fourth Zone | Fifth Zone | | |
| 1. Farwell | 4.64 | .... | ..... | ..... | ..... | .... | ..... | 4.64 |
| 2. Oakland, W.F.B., Fox Point | 4.26 | 1.01 | 1.07 | 0.91 | 0.88 | 0.78 | 5.90 | 10.16 |
| 3. Holton Street | 3.04 | .... | ..... | ..... | ..... | .... | ..... | 3.04 |
| 4. Third Street | 3.28 | .... | ..... | ..... | ..... | .... | ..... | 3.28 |
| 5. Eighth Street | 4.27 | .... | ..... | ..... | ..... | .... | ..... | 4.27 |
| 6. Twelfth Street, North Milwaukee | 4.66 | 1.50 | 1.15 | ..... | ..... | .... | 2.65 | 7.31 |
| 7. Fond du Lac | 3.78 | .... | ..... | ..... | ..... | .... | ..... | 3.78 |
| 8. Wanderer's Rest | 4.13 | 1.07 | 0.37 | ..... | ..... | .... | 1.44 | 5.57 |
| 9. Pabst-Wauwatosa | 4.80 | 1.44 | ..... | ..... | ..... | .... | 1.44 | 6.24 |
| 10. Vliet Street | 4.46 | .... | ..... | ..... | ..... | .... | ..... | 4.46 |
| 11. State Street | 2.70 | .... | ..... | ..... | ..... | .... | ..... | 2.70 |
| 12. Wells Street, Wauwatosa | 4.52 | 1.02 | 0.83 | ..... | ..... | .... | 1.86 | 6.38 |
| 13. Clybourn Street | 2.57 | .... | ..... | ..... | ..... | .... | ..... | 2.57 |
| 14. National-West Allis | 5.42 | 1.08 | 0.60 | ..... | ..... | .... | 1.68 | 7.10 |
| 15. Burnham-West Allis | 5.78 | 1.58 | 0.52 | ..... | ..... | .... | 2.10 | 7.88 |
| 16. Muskegon | 3 78 | .... | ..... | ..... | ..... | .... | ..... | 3.78 |
| 17. Mitchell Street | 4.41 | .... | ..... | ..... | ..... | .... | ..... | 4.41 |
| 18. Eighth Avenue | 4.67 | .... | ..... | ..... | ..... | .... | ..... | 4.67 |
| 19. First Avenue | 4.34 | .... | ..... | ..... | ..... | .... | ..... | 4.34 |
| 20. Howell-Tippecanoe | 3.89 | 1.05 | 0.48 | ..... | ..... | .... | 1.53 | 5.42 |
| 21. South Milwaukee | 4.19 | 1.23 | 0.87 | 0.91 | 0.83 | 1.17 | 7.17 | 11.36 |
| 22. Delaware Avenue | 4.52 | .... | ..... | ..... | ..... | .... | ..... | 4.52 |
| 23. Wisconsin Street | 1.30 | .... | ..... | ..... | ..... | .... | ..... | 1.30 |
| 24. Michigan Street | 1.38 | .... | ..... | ..... | ..... | .... | ..... | 1.38 |

NOTE.—Line No. 2 has a sixth zone 1.25 miles in length; Line No. 21 has a sixth zone 1.15 miles in length and a seventh zone 1.01 miles in length.

A comparison of the length of these lines and an examination of the map on page 950 will disclose the variation of the boundaries of the Metropolitan District from a true circle. Some of these city lines are through or radial lines extending from the outer limits of the Metropolitan District in one division of the city through the downtown district and continuing on to the outer boundary of the Metropolitan District in another division of the city, and some extend beyond into the suburban territory. Some of the city lines are entirely of the crosstown character and do not approach the center of traffic. The map is similar to that displayed in card form in the cars of the company.

Beyond the limits of the Metropolitan District upon each of the suburban or interurban lines radiating from the city nine lines comprising this system have been divided into geographical zones approximating 1 mile in length, the zone points being placed at principal traffic points where such was possible within reasonable variation in distance from the 1-mile point.

The charge for a ride from any point within the Metropolitan District into or through each such geographical zone is 2 cents in addition to the city fare. For any local suburban haul originating and terminating beyond the Metropolitan District, the fare is computed in like manner as the suburban components of the above rates of fare, the minimum cash fare for any ride being 5 cents.

On the interurban lines extending beyond the limits of the suburban territory the fare charged is 2 cents for each additional mile, the interurban fares being computed to the nearest 1 cent. Where interurban lines pass through the principal outlying cities or subterminals for distances ranging from 2 miles to 3 miles a 5-cent cash fare is substituted for the 2-cent-per-mile rate, thus providing a single 5-cent fare within the city limits of each of the sub-terminals. For "through interurban passenger service" upon all interurban lines, the mileage included within the Metropolitan District of the city of Milwaukee is in every case computed at 4 cents. For passengers riding locally on interurban cars between the Metropolitan District and the outer limits of the suburban service zones, the charge in every case is the same as the rate of fare for suburban service. The rates of fare per passenger for all interurban service between points outside the Metropolitan District of the city of Milwaukee is the difference between the through rates to these points. The through fare between sub-terminals is equal to the sum of the local fares. Non-transferable individual 300-mile mileage books at 1.8 cents per mile, good for the payment of any interurban or suburban fare, with a minimum tear of 5 miles, are sold through conductors on interurban cars. When the cash fare is odd, the next highest fare is torn.

Upon both suburban and interurban lines, children under three years of age are carried free. Children between the ages of three and ten, inclusive, are carried for one-half the full fare. All passengers are entitled to the usual transfer privilege within the single-fare limits of the city of Milwaukee and to transfers upon the several suburban lines, provided, however, that no such transfer shall operate to compel the company to carry a passenger on the suburban lines for less than the regular fare of each 2-cent distance or fraction thereof on each line within which the passenger rides.

When the new fares were placed into effect all abandoned reduced-rate and round-trip tickets outstanding were honored for a period of thirty days, after which they became void upon the cars but were redeemed on demand at a pro rata portion of the original cost.

### COMPARISON OF ZONE SYSTEM WITH FORMER RATES

The distances, comparative over all cash rates and resulting rates per adult passenger-mile, on all suburban lines, as measured from the center of gravity of traffic in the Metropolitan District, are contained in Table II.

Reference to the map on page 950 will disclose that the center of gravity of the street railway traffic, marked *T*, coincides closely with the center of population, marked *P*, the former point extending about 3000 ft. in the direction of the business district. The terminus of all interurban lines and of the longest suburban or South Milwaukee line, or the Public Service Building, whose location is marked *P. S. B.*, is also close at hand. In fact, the three focal points—center of traffic, center of population and the terminal building—are within 2900 ft. to 3500 ft. distant from one another.

During various discussions before the commission upon the reasonableness of uniform rates and distances in the suburban territory, an attempt was made to show discriminations in the application of such uniform rates by associating the distance to various suburban points from the Public Service Building rather than from the limits of the Metropolitan District within which the city fare applies for any distance. It will be noted

TABLE II—DISTANCES AND RATES, ETC., FOR FORMER AND PRESENT CONDITIONS

| Suburban Line | DISTANCE | | Overall Distance (Miles) | OVER-ALL RATES CITY PLUS SUBURBAN | | Number of Suburban Zones, Present Basis (Number) | OVER-ALL RATE CITY PLUS SUBURBAN ADULTS' RATE PER PASSENGER-MILE | | Distribution Suburban Revenue, per cent |
|---|---|---|---|---|---|---|---|---|---|
| | City (Miles) | Suburban (Miles) | | Former (Cents) | Present (Cents) | | Former (Cents) | Present (Cents) | |
| 1. Oakland W.F.B.F.P. | 4.25 | 5.90 | 10.16 | 15 | 17 | 6 | 1.48 | 1.67 | 9.4 |
| 2. North Milwaukee.... | 4.66 | 2.65 | 7.31 | 10 | 9 | 2 | 1.37 | 1.23 | 7.3 |
| 3. Wanderer's Rest..... | 4.13 | 1.44 | 5.57 | 10 | 9 | 2 | 1.79 | 1.61 | 2.3 |
| 4. Walnut-Wauwatosa | 4.80 | 2.27 | 7.07 | 10 | 9 | 2 | 1.41 | 1.27 | 3.7 |
| 5. Wells-Wauwatosa.... | 4.52 | 1.86 | 6.38 | 10 | 9 | 2 | 1.57 | 1.41 | 10.0 |
| 6. National-West Allis. | 5.42 | 1.68 | 7.10 | 10 | 9 | 2 | 1.41 | 1.27 | 12.7 |
| 7. Burnham-West Allis. | 5.78 | 2.10 | 7.88 | 10 | 9 | 2 | 1.27 | 1.14 | 8.0 |
| 8. Tippecanoe | 3.89 | 1.53 | 5.42 | 5 | 9 | 2 | 0.92 | 1.66 | 3.1 |
| 9. South Milwaukee.... | 4.22 | 7.17 | 11.39 | 10 | 19 | 7 | 0.88 | 1.67 | 43.5 |
| Weighted average rate per passenger-mile..... | | | | | | | 1.18 | 1.50 | 100. |

NOTE.—These comparisons are based upon a 5-cent cash city fare. The actual average city fare from city tickets and cash was 4.18 cents per revenue passenger for the year 1913.

that the zone distance as determined by the commission is based upon the outer limits of the Metropolitan District rather than with reference to the central points described, although such central points were undoubtedly considered in determining the limits of the Metropolitan District.

With the application of the zone system to the suburban lines, changes in rates became necessary on all interurban lines. The commission found from its computations as to the cost of the interurban service that actual costs justified the establishment of basic rates to yield about 2.75 cents per passenger-mile. "When the conditions prevailing on the interurban system are considered, * * *" it stated, however, "it seems best to place the rate at a lower figure than the cost of service would demand so as to encourage the passenger density with this lower rate to increase sufficiently to bring the revenue to the point where it will bring an adequate return above all expenses."

A comparison of the old and new rates on the interurban lines is shown on the accompanying diagrams. These show clearly the rates on a distance basis, measured from the outer limits of the Metropolitan District, as compared with similar rates as measured from the Public Service Building and rates upon the old 5-cent basis, together with a statement of the number of rates not changed and those increased and decreased by the application of the zone system.

## METHODS OF COLLECTION

All city and suburban cars of the company are of the prepayment type, either with semi- or fully-inclosed platforms with folding doors, the latter cars having no bulkheads. Small portable fare boxes are used, except on interurban cars carrying through service. These fare boxes are of light aluminum construction, with wireglass sides exposing the fares to view, and are provided with convenient handle for portable use.

Under the present system of 2-cent suburban zone fare collections, passengers originating at or destined to points within the Metropolitan District pay 5 cents cash or a city ticket, and in addition thereto 2 cents cash or one 2-cent zone ticket for each 1 mile suburban zone into or through which the passenger rides, in the manner hereafter described, the passengers being entitled to one transfer within the Metropolitan District, if requested, at the time fare is paid.

One objection to such a system is that it involves the collection of small increments for added fares with the probable use of a large number of pennies and necessitates care in accurately ascertaining the zone into which outbound suburban passengers had paid their fares.

To meet this problem the company provided for the sale of suburban zone tickets by conductors on the cars. These tickets have a value of 2 cents each, are printed with a broad red band across each face, and are of the same size as the city ticket but are readily distinguished from these. Zone tickets are sold in small quantities at no discount and are good only for one ride into or through any one suburban fare zone. During the last four months the sales of such zone tickets have aggregated 21.8 per cent of the suburban revenues, and their use has practically eliminated the anticipated troubles arising from the collection of fares in pennies. Conductors on city and suburban runs are provided daily with $25 in value of city tickets, $5 in value of 2-cent zone tickets, and provide themselves with $5 in change, an amount which is no different from the change carried prior to the establishment of the zone system.

The problem of checking destination necessitated a change in the regular transfers used upon lines reaching into the suburban territory so as to provide space for the conductor to punch time and zone destination by name to which the passenger has paid fare. In the case of the longest suburban line, comprising seven 2-cent zones, a special zone receipt was necessary because of lack of space on the regular transfer. This form of receipt is issued to all outbound passengers originating within the Metropolitan District except those destined to points within the first 2-cent suburban fare zone adjacent to the Metropolitan District, on all lines except in the case of the longest line. As passengers leave the cars beyond the first zone the receipts are lifted by the conductor and remitted in the usual way.

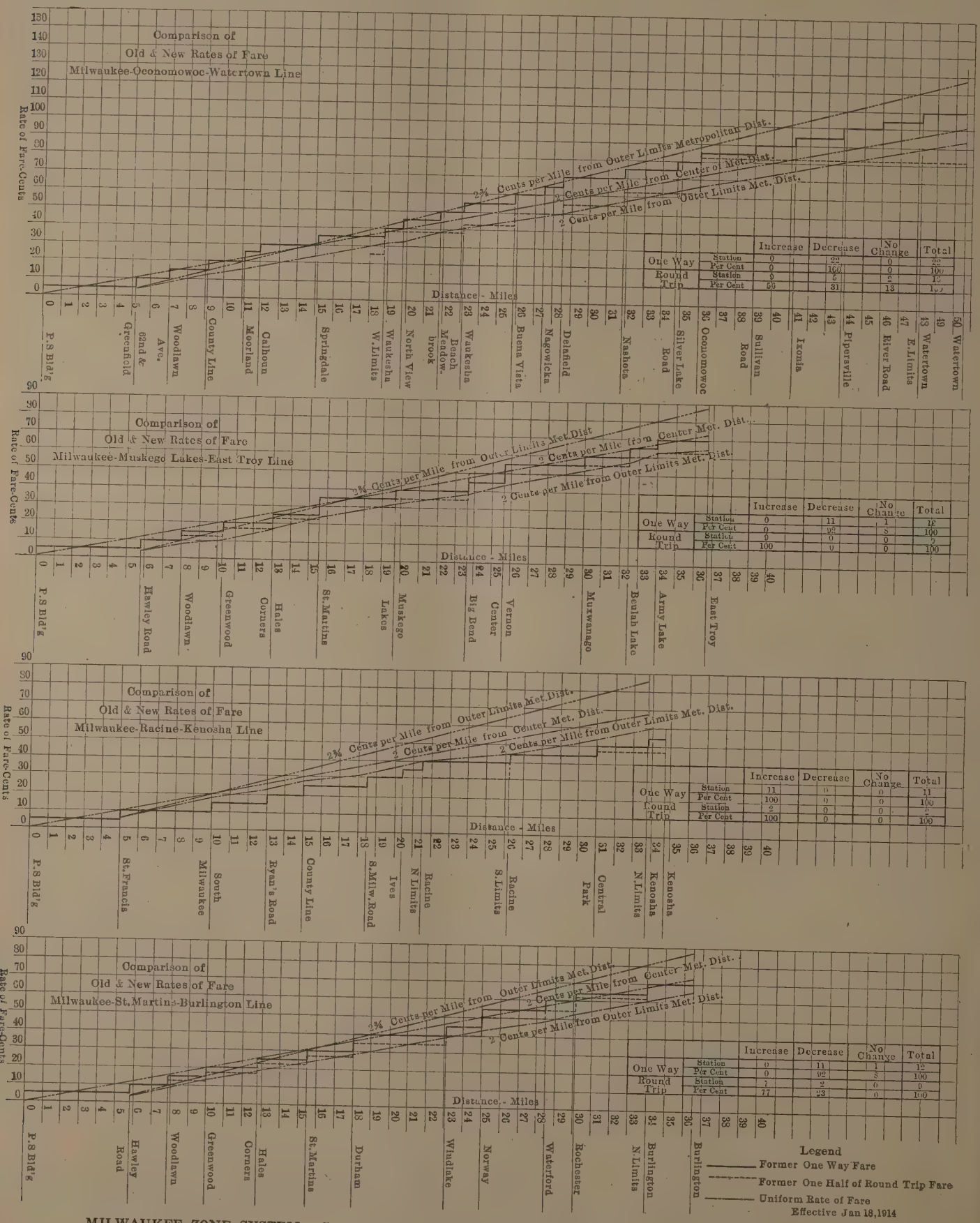
Outbound passengers may pay regular city fare to the city fare limits and continue their journey into suburban territory upon payment of the necessary additional 2-cent zone fares in cash or zone tickets or may pay through fare to suburban destination when boarding the car. When suburban cars pass from the Metropolitan District to suburban territory, the conductor enters with the portable fare box and collects the suburban fare from the passengers who have not paid through fare to destination, issuing the transfer receipts accordingly. When passengers leave the car beyond the first suburban zone, the receipt is surrendered to conductor who checks destination and collects any deficiency.

Inbound suburban passengers when boarding cars are requested by conductor to make prepayment of through fare to the Metropolitan District and place the amount in the fare box in cash or tickets. No receipts for fare paid are given to inbound passengers, except upon the longest line of seven zones. On this line, when cars pass into the Metropolitan District, the receipts are lifted to check passengers who have paid city fare.

The minimum cash fare for any ride in suburban territory is 5 cents. Two-cent suburban zone tickets are not honored within the Metropolitan District and are not good for the initial ride in suburban territory unless three or more are paid at the same time for each passenger for a continuous ride. Conductors report on trip sheets the actual number of passengers on car entering and leaving the Metropolitan District and, in addition, the number of passengers on and off in each 2-cent zone. This information serves as a basis for the division of earnings.

The collection of fares under this system has worked out satisfactorily and, since the elimination of various experimental schemes, does not now involve delay or

congestion. It is also believed to provide means for collection of all fares in a practical manner. On special occasions, such as large crowds at suburban resorts, State Fair and during rush hours when large numbers of workingmen are concentrated at certain points, the collection of fares is facilitated by the use of extra fare collectors for short periods of time, who assist by collecting fares and by loading the large interurban cars usually employed for this service at both ends. In some special cases small portable ticket booths have been employed where through tickets from suburban resorts to the Metropolitan District are sold, thus greatly facilitating the rapid loading of cars. This plan has eliminated the difficulties anticipated at congested points, as a large percentage of passengers purchase tickets at the ticket booths.




MILWAUKEE ZONE SYSTEM—COMPARISON OF OLD AND NEW RATES OF FARE ON VARIOUS LINES

Interurban cars do not carry local city passengers. Such cars stop, however, at frequent points outbound in the city to pick up passengers destined to suburban points and beyond. Inbound cars within the Metropolitan District discharge passengers only. The collection of fares on all interurban cars in through service consists merely in lifting tickets sold at agencies or collecting cash fares and issuing proper receipt therefor.

### COST OF SUBURBAN SERVICE

The cost of service for suburban and interurban traffic has not been of controlling importance in the establishment of the rates of fare, as provided in the order of the commission, since, like many suburban and interurban properties, it was evident that any rates of fare which purported to pay a reasonable return upon the investment would be prohibitive and result in decreased traffic. It is of interest to compare, however, the revenues resulting from the operation of the zone system with the costs of furnishing the service rendered.

In the development of the cost of service, the method employed is that used heretofore on the company's properties and consists of separately localizing revenues, operating costs and the value of the tangible property as determined by the commission used and useful for railway purposes. Each of the several lines has been separately treated, and a summary showing the cost of service on the combined lines determined.

Operating expenses are grouped according to the unit with which the expense item varies, and miles of track, car-miles, car-hours and revenue passengers have been used as the unit of apportionment. Depreciation and return upon the investment in tangible property have been computed upon the investment applicable to each suburban line. When assembled these figures constitute an income account for any line and enable the determination of its unprofitableness. The operating expenses were determined from the actual expenses for the first eight months of the year 1914 and the remainder of the year estimated.

These expenses have been grouped as follows:

(a) Under expenses, varying with the car-hour, there are included: wages of conductors and motormen; incandescent lamps for lighting cars; water and supplies for cleaning cars; fuel, kindling and other supplies for heating cars; miscellaneous transportation expenses.

(b) Under expenses varying with the car-mile, there are included: 43.88 per cent of the way and structures group of charges; equipment; lubricating supplies for cars and motors; miscellaneous car service, supplies and expenses.

(c) Under expenses, varying with the miles of single track there are included: the remaining portion of the way and structures group of charges (56.12 per cent).

(d) Under expenses varying with the revenue passengers carried, there are included: superintendence of transportation; wages of miscellaneous car service employees; tickets, transfers, etc.; secret inspection; ticket punches, motormen's tools, badges, etc.; wages of station employees; wages of carhouse employees; miscellaneous carhouse expenses; operation of telephone system; patrol and wreck service expenses; injuries and damages (actual expenditures).

(e) Under power plant expenses, varying with the car-mile, there are included: power apportioned (proportionate cost of power).

(f) As overhead expense there are included: general expense; insurance; stationery; operation of stores department; maintenance of stores department equipment; maintenance of stores department buildings, fixtures and grounds; rent of land, buildings and other property; taxes.

Such expenses have been apportioned as a definite percentage of classes (a) to (e).

(g) Under depreciation there has been included an amount calculated at 4.38 per cent of the reproduction cost new on the suburban lines, being the basis of the amount estimated by the Railroad Commission of Wisconsin in the previous fare case and chosen for purposes of illustration.

(h) Return upon the tangible property has been calculated at 8 per cent. This likewise follows the percentage in the commission's 1914 calculations.

The reproduction cost new of the various lines is based upon the Railroad Commission valuation as of Jan. 1, 1910, to which has been added the property additions made subsequent to that date to bring the valuation in this case to June 30, 1914, for the purpose of determining the cost of service for the year ending Dec. 31, 1914. The physical property has been assigned to the zone or line of which it is a part wherever possible, but such items as land, power plants, rolling stock, etc., have been apportioned on a car-mile or car-hour basis as appeared proper, using operating units for these zones for the year 1914 for determining such apportionment, land being apportioned on the car-hour basis; roadway and paving, transmission and distribution system being directly applied in accordance with the geographical location of this property; power plants, with their buildings and grounds being apportioned on the car-hour basis, and railway stock, with its buildings and grounds being apportioned on the car-mile basis.

The valuations as obtained are approximate. It is believed that the method used is as accurate as can be followed without an extended appraisal. The company is engaged in an extensive valuation of its property, and it is believed when this work is completed the reproduction cost new of the various lines will be materially increased, as the results obtained up to the present time indicate that the old inventories were not complete and that old unit prices used were in many cases too low. Owing to the present lack of returns upon any basis, the correction of these appraisals is a matter of principle rather than of necessity, to substantiate the reasonableness of present earnings.

The combined suburban lines heretofore referred to, and comprising the suburban zone system, show roughly total operating revenues for the year 1914 of $252,672, with an approximate reproduction cost new of $1,191,864. For each $1 of revenue the valuation amounts to $4.71. The actual return upon the reproduction cost new for the year amounts to 1.71 per cent, showing a deficit on the basis of an 8 per cent return of $74,961. There are appended hereto typical detailed tabulations showing the cost of service so determined for several of the suburban lines comprising the zone system, together with a combined statement.

A summary of the cost of service of the suburban lines is shown in Table III.

TABLE III—SHOWING RETURNS OF INDIVIDUAL LINES

| | Per Cent of Total Revenue | Operating Revenues | Operating Expenses (Cost) | Deficit | Per Cent of Return |
|---|---|---|---|---|---|
| Whitefish Bay Fox Point | 9.4 | $23,781 | $44,163 | $20,381 | −3.54 |
| North Milwaukee | 7.3 | 18,561 | 25,806 | 7,244 | −0.51 |
| Wanderer's Rest | 2.3 | 5,732 | 11,585 | 5,853 | −8.96 |
| Walnut–Wauwatosa | 3.7 | 9,364 | 14,230 | 4,866 | −3.23 |
| Wells–Wauwatosa | 10.0 | 25,172 | 26,837 | 1,665 | +6.08 |
| National–West Allis | 12.7 | 32,072 | 38,690 | 6,618 | +3.03 |
| Burnham–West Allis | 8.0 | 20,157 | 30,364 | 10,206 | −0.57 |
| Tippecanoe | 3.1 | 7,828 | 17,894 | 10,065 | −10.72 |
| South Milwaukee | 43.5 | 109,999 | 118,059 | 8,059 | +6.25 |
| Combined | 100.0 | $252,671 | $327,632 | $74,960 | +1.71 |

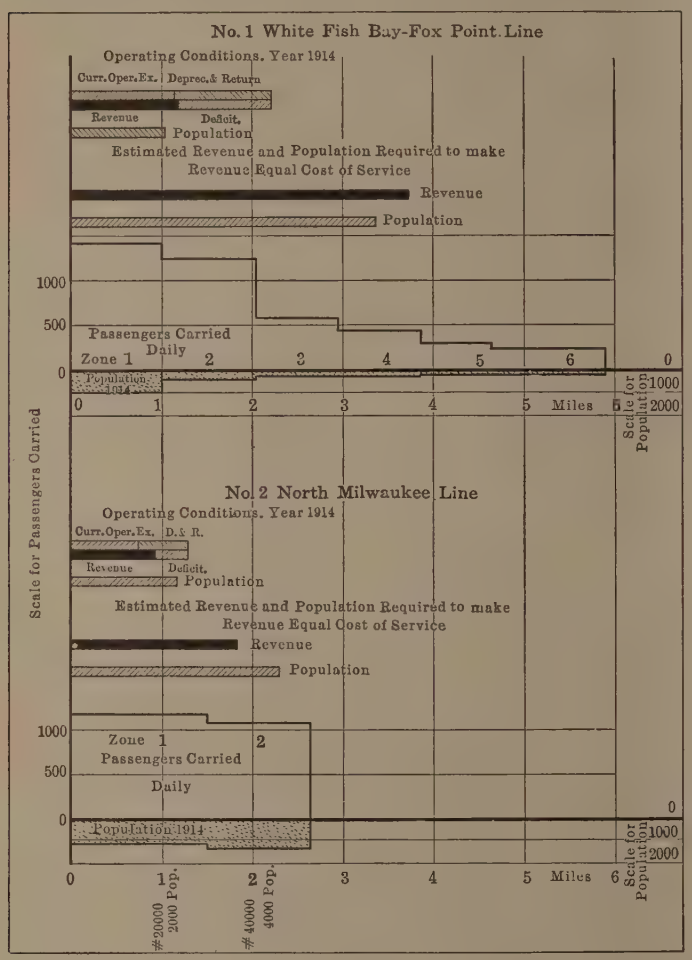
## DISTANCE DISTRIBUTION OF PASSENGER TRAFFIC—COST AND EARNINGS AND ESTIMATE OF ADDITIONAL REVENUE REQUIRED TO EQUAL COST OF SERVICE

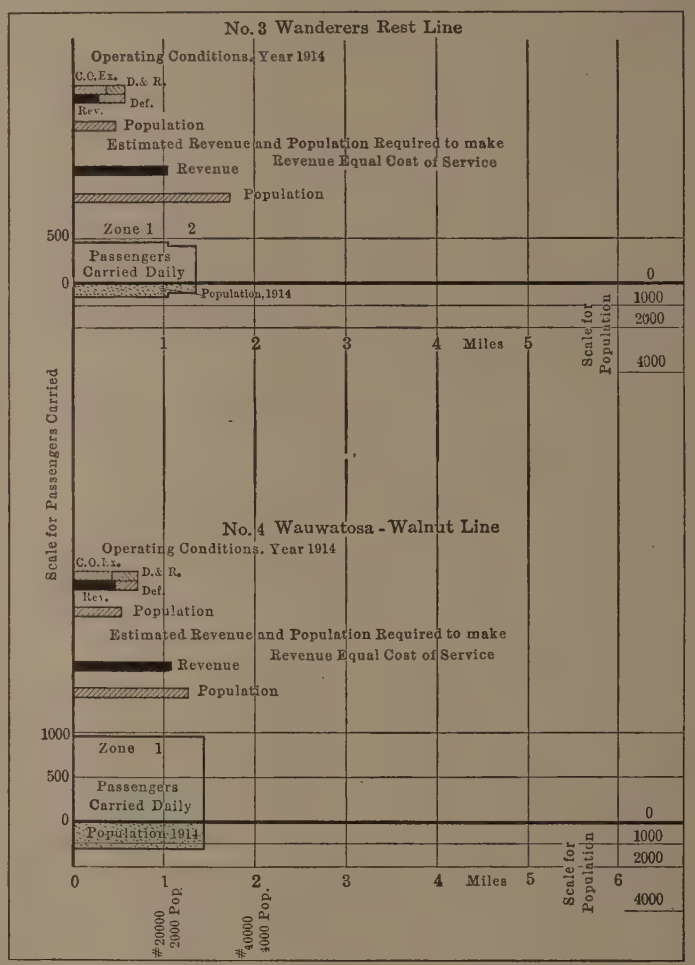
The normal distance distribution of traffic by days from the metropolitan district to the end of each suburban line by zones, determined by the use of conductor's trip sheet records, the tributary population by zones, the revenues, current operating expenses, depreciation and return and deficit by lines are graphically shown on charts, which illustrate the results of the computations of the cost of service.

The unit costs per car-mile, per car-hour, miles of single track, together with revenue passenger and passengers per mile, population and average rides per capita for the year 1914, are shown in Table IV for each of the suburban lines computed from the data heretofore referred to.

TABLE IV—COMPARISON OF REVENUE AND OTHER DATA FOR THE VARIOUS LINES

| Line | Revenue per Car-Hour | Revenue per Car-Mile (Cents) | Revenue per Passenger (Cents) | Revenue per Mile Single Track | Miles of Single Track | Passengers per Car-Mile | Tributary Population | Annual Rides per Capita |
|---|---|---|---|---|---|---|---|---|
| 1 | $2.39 | 19.83 | 4.85 | $2,591 | 9.18 | 4.1 | 2,140 | 229 |
| 2 | 2.43 | 22.09 | 4.04 | 5,396 | 3.44 | 5.5 | 2,334 | 197 |
| 3 | 1.10 | 17.83 | 4.02 | 3,899 | 1.47 | 4.4 | 960 | 148 |
| 4 | 1.55 | 30.42 | 3.02 | 6,503 | 1.44 | 10.1 | 1,097 | 282 |
| 5 | 3.13 | 31.88 | 3.79 | 9,719 | 2.59 | 8.4 | 2,330 | 286 |
| 6 | 2.82 | 30.55 | 3.50 | 8,909 | 3.60 | 8.7 | 3,777 | 243 |
| 7 | 2.95 | 24.48 | 3.79 | 4,500 | 4.48 | 6.5 | 1,760 | 302 |
| 8 | 1.17 | 12.25 | 2.84 | 4,774 | 1.64 | 4.3 | 1,050 | 262 |
| 9 | 4.05 | 28.88 | 6.43 | 7,402 | 14.86 | 4.5 | 10,642 | 161 |
| Combined | $2.83 | 25.83 | 4.59 | $5,917 | 42.70 | 5.6 | 26,090 | 211 |




MILWAUKEE ZONE SYSTEM—RESULTS ON LINES 1, 2, 3 AND 4

the traffic, population and rate of return by lines may be traced to the characteristics of the several lines:

(1) The Whitefish Bay-Fox Point line passes through a residential district after leaving the metropolitan district, through the first four zones or to the north limit of the city. The rate of return is low, the traffic is light and the population is sparse. (2) The North Milwaukee line passes through a residential district after leaving the metropolitan district, through the first two zones or to the city limit. The rate of return is low, the traffic is light and the population is sparse. (3) The Wanderers Rest line passes through a residential district after leaving the metropolitan district, through the first two zones or to the city limit. The rate of return is low, the traffic is light and the population is sparse. (4) The Wauwatosa-Walnut line passes through a residential district after leaving the metropolitan district, through the first zone or to the city limit. The rate of return is low, the traffic is light and the population is sparse.

Assuming that the valuation, rate of return and depreciation, together with the per cent of overhead expense burden to current operating expenses, remain the same as in the 1914 statement and that no reduction in the service heretofore operated be made on any suburban line, the additional revenue and passengers required on each line to justify the present investment and make revenues just equal the cost of service, are estimated as shown in Table V.

The additional revenue and passengers required as shown in Table V have been determined on an assumption that the current operating expenses by lines with growth in business necessary to earn a reasonable return will approximate 60 per cent of the total cost of service. The number of passengers has been determined from the additional revenue thus required on the basis of the average fare per passenger for the year 1914, for each line separately.

The causes for any differences in the distribution of

TABLE V—DATA FOR 1914 AND ADDITIONAL REVENUE AND PASSENGERS REQUIRED IN 1915 TO MAKE REVENUES EQUAL COST OF SERVICE

| Line | Year 1914: Depreciation and Return, per Cent to Total | Year 1914: Current Operating Expenses, per Cent to Total | Year 1914: Amount of Deficit | Additional Revenue Required, 60 per Cent Basis | Additional Passengers Required | Revenue Passengers, 1914 | Per Cent Additional Passengers Required |
|---|---|---|---|---|---|---|---|
| 1 | 49.8 | 50.2 | $20,381 | $50,952 | 1,050,557 | 490,475 | 214. |
| 2 | 41.0 | 59.0 | 7,245 | 18,113 | 448,341 | 459,072 | 98. |
| 3 | 37.0 | 63.0 | 5,854 | 14,635 | 364,055 | 142,536 | 255. |
| 4 | 38.0 | 62.0 | 4,866 | 12,165 | 402,814 | 309,787 | 130. |
| 5 | 37.2 | 62.8 | 1,666 | 4,165 | 109,894 | 663,343 | 17. |
| 6 | 41.0 | 59.0 | 6,618 | 16,545 | 472,714 | 917,307 | 52. |
| 7 | 49.5 | 50.5 | 10,206 | 25,515 | 673,087 | 531,776 | 127. |
| 8 | 38.0 | 62.0 | 10,065 | 25,163 | 886,211 | 275,234 | 322. |
| 9 | 48.0 | 52.0 | 8,059 | 20,147 | 313,328 | 1,710,086 | 18. |
| Combined lines | 45.0 | 55.0 | $74,960 | $187,400 | 4,721,001 | 5,499,166 | 85.8 |

its of Whitefish Bay. The first zone is entirely within the limits of the village of East Milwaukee, which had a population of 707 in the 1910 census. The second, third and fourth zones lie entirely within the limits of Whitefish Bay, which had a population of 542 in the 1910 census. The resort at this location also contributes a considerable amount of summer business. Both of these villages have increased considerably in population since the last census. From that point north the territory is sparsely settled and is mainly farming land, except that there is a country club at Fox Point and this line has much summer picnic traffic.

(2) On the North Milwaukee line, the first zone after leaving the metropolitan district first passes through vacant property and into a fairly well settled residential district. The north end of this zone and the second zone lies entirely within the village of North Milwaukee, a manufacturing suburb, having a population of 1860, according to the 1910 census.

(3) Both zones of the Wanderer's Rest line pass through a very sparsely settled farming district. Wanderer's Rest Cemetery at the end of the line creates some Sunday traffic. This is a portion of a line it was originally proposed to extend into interurban territory.

(4) On the Walnut Street-Wauwatosa line the single zone lies entirely within the residential suburb of Wauwatosa and is used in connection with Zones 1 and 2 of Line 5. This suburb had 3346 people in 1910.

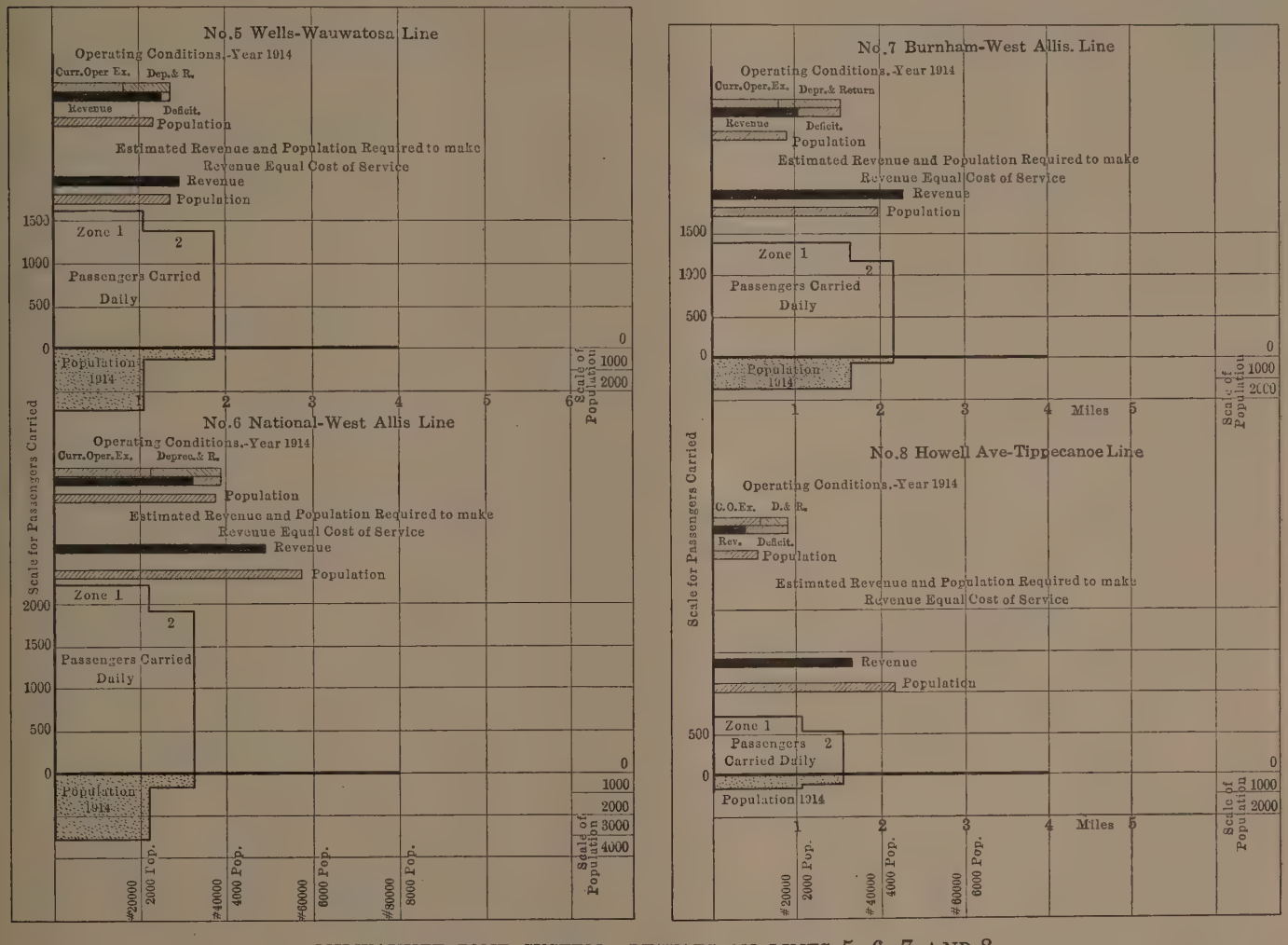
(5) On the Wells Street-Wauwatosa line the first zone lies entirely within the city of Wauwatosa. Part of the second zone of this line extends beyond the city limits of Wauwatosa to the county farm.

(6) Both zones, National-West Allis line, of this line lie entirely within the manufacturing and suburban city of West Allis. This suburb had a population of 6645 in the 1910 census. The second zone is entirely in the residential portion of the city.

(7) Both zones of the Burnham-West Allis line lie entirely within the city of West Allis, but the line passes entirely south of the thickly settled portion of that city and, therefore, does only a small local business.

(8) Both zones of the Howell Avenue-Tippecanoe line are outside of the limits of any municipality, but the district is only fairly well built up with residences.

(9) On the South Milwaukee line the first zone passes through a residence district which gradually thins out. There is one small college located within this zone. A portion of the second zone has the same characteristics of the first zone, but passes through ½ mile of vacant property and enters partly into the manufacturing section of the city of Cudahy. The third zone lies entirely within the city of Cudahy. The fourth zone lies partly within the outskirts of Cudahy and partly in a sparsely settled district adjacent. The city of Cudahy had a population of 3691 in the 1910 census. The fifth zone lies partly within the above district and partly within the manufacturing city of South Milwaukee. This city had a population of 6092 in the 1910 census. The sixth zone lies entirely within the central portion of the city of South Milwaukee. Both branches of the seventh zone also lie entirely within the city of South Milwaukee but reach into the thinly populated sections on the outskirts of that city.

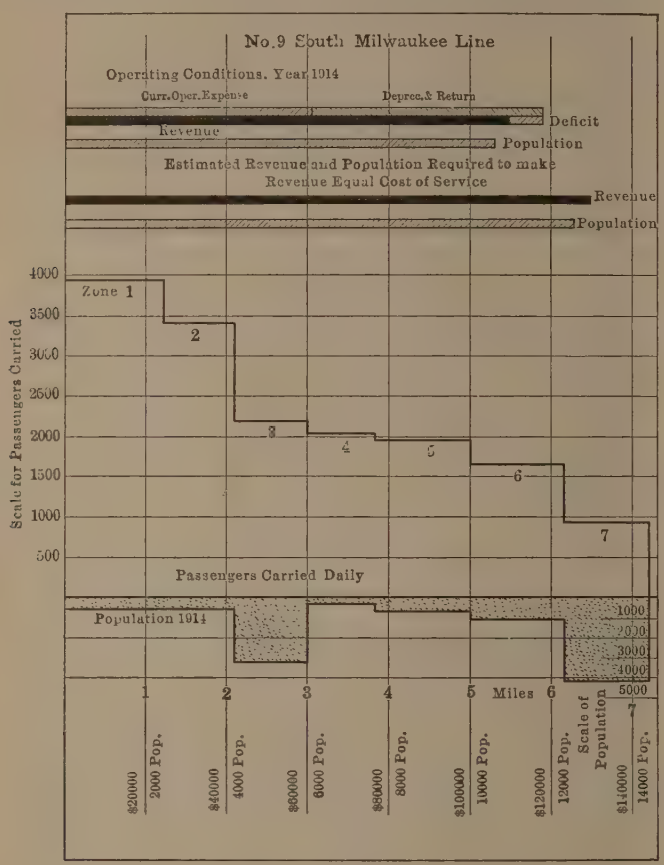



MILWAUKEE ZONE SYSTEM—RESULTS ON LINES 5, 6, 7 AND 8

## EUROPEAN ZONE SYSTEM

An opportunity was presented to analyze and tabulate certain data relating to the application of the street

railway zone system and methods of collecting fares in a number of foreign cities. The information from which this tabulation was prepared was obtained from the files of the secretary of the American Electric Railway Association, consisting of voluminous letters and exhibits received from various foreign companies in response to a circular letter which was sent out by the secretary under date of Sept. 11, 1912, at the request of the committee to study the best methods of collecting and accounting for variable rates of fare. The material was arranged, translated and abstracted by a special committee appointed from members of the Milwaukee Company Section No. 1, A. E. R. A. An abstract of the report for each city and a tabulation showing the summary of the results obtained is appended hereto. Since the general practice of all the cities is very similar as to methods of collecting and accounting for fares, the abstract for the city of Leeds, England, which is appended separately, is typical of all. The principal differences in details of practice are clearly shown in the tabulation.




MILWAUKEE ZONE SYSTEM—RESULTS ON LINE 9

A study of the report indicates that:

(1) The zone system is used in all of the sixteen European cities from which reports were received.

(2) The length of ride and rates of fare are varied, but considering the purchasing value of money, the rates are generally higher than the fares in this country and higher than those obtaining in Milwaukee.

(3) Small increments in the fares for additional distance traveled are provided throughout the congested or central districts as well as the outlying districts.

(4) The rates provide much higher fares for the distance equivalent to the boundary of the central zone than exist in Milwaukee and probably other American cities. The same is noted for total fare to other zones.

(5) A marked similarity in the methods for collecting and recording fares in all of the cities is noted. In every instance receipts are given for the fares when collected and these receipts are subject to check by inspectors who board cars at unexpected intervals.

TABLE VI—COST OF SERVICE ON THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY COMBINED SUBURBAN LINES (1-9 INCLUSIVE), YEAR ENDING DEC. 31, 1914

(From Limits of Metropolitan District to Terminus of Suburban Service)

| | Amount | Number of Units | Cost per Unit |
|---|---|---|---|
| Operating revenues (total) | $252,671 | ..... | ..... |
| Operating expenses (total) | 327,632 | ..... | ..... |
| (a) Costs varying with the car-hour | 49,776 | 88,982 | $0.5594 |
| (b) Costs varying with the car-mile | 25,426 | 977,955 | .0260 |
| (c) Costs varying with the miles of single track operated | 18,103 | 42.70 | 423.9658 |
| (d) Costs varying with the number of revenue passengers carried | 28,598 | 5,499,616 | .0052 |
| (e) Costs of electrical energy-car-mile | 22,297 | 977,955 | .0228 |
| (f) Administrative and overhead expense burden | 35,877 | Per cent (a) to (e) | 24.88 per cent |
| (g) Depreciation reserve[1] | 52,203 | ..... | ..... |
| (h) Return upon tangible property[2] | 95,349 | ..... | ..... |
| Deficit | 74,960 | ..... | ..... |

[1]4.38 per cent on $1,191,864.
[2]8 per cent on $1,191,864.
Actual return upon reproduction cost new.....1.71 per cent

Reproduction cost new, $1,191,864, is based upon Railroad Commission valuation as of Jan. 1, 1910, corrected to June 30, 1914. Earnings and expenses including all service operated are actual for the first eight months of the year 1914; remainder of year estimated.

(6) The issue of transfers generally carries extra charge and free transfers are exceptional.

(7) Special fares for workmen and special ticket rates are common, but limited to restricted hours, usually issued before 7:30 a. m. and good for return before 8 p. m.

The close similarity in certain features of operation of the zone system in all of the cities is quite marked. The information does not disclose whether this similarity has arisen through precedent or whether the experience of all the companies has gradually led to the adoption of the same methods through the process of cut and try. The limited means of working classes and the consequent necessity for strict economy have undoubtedly been the main factors in developing short zones and small units of fare at the expense of congestion and higher rates of fare to others in the outlying districts. As the information procured was limited to rates of fare and methods of collection and did not contain financial statements or other traffic statistics, no conclusion can be drawn with respect to the cost of the service.

It is certain, however, that valuable lessons can be learned through studying the methods of our careful, painstaking neighbors, and the adoption of certain details of the European methods in this country would undoubtedly prove advantageous.

## ADVANTAGES TO BE DEVELOPED BY THE ZONE SYSTEM

At the risk of repeating statements heretofore made on this subject, the zone idea is based upon the assumption that it is more desirable to maintain the single-

TABLE VII—COST OF SERVICE ON OAKLAND-DELAWARE AVENUES, WHITEFISH BAY AND FOX POINT SUBURBAN LINE (1), YEAR ENDING DEC. 31, 1914

(From Limits of Metropolitan District to Terminus of Suburban Service)

| | Amount | Number of Units | Cost per Unit |
|---|---|---|---|
| Operating revenues (total) | $23,781.97 | ..... | ..... |
| Operating expenses (total) | 44,163.42 | ..... | ..... |
| (a) Costs varying with the car-hour | 5,557.08 | 9,934 | $0.5594 |
| (b) Costs varying with the car-mile | 3,117.66 | 119,910 | .0260 |
| (c) Costs varying with the miles of single track operated | 3,892.01 | 9.18 | 423.9658 |
| (d) Costs varying with the number of revenue passengers carried | 2,550.47 | 490,475 | .0052 |
| (e) Costs of electrical energy-car-mile | 2,733.95 | 119,910 | .0228 |
| (f) Administrative and overhead expense burden | 4,441.37 | Per cent (a) to (e) | 24.88 per cent |
| (g) Depreciation reserve[1] | 7,737.84 | ..... | ..... |
| (h) Return upon tangible property[2] | 14,133.04 | ..... | ..... |
| Deficit | 20,381.45 | ..... | ..... |

[1]4.38 per cent on $176,663.
[2]8 per cent on $176,663.
Actual return upon reproduction cost new.....3.54 per cent deficit

Reproduction cost new, $176,663, is based upon Railroad Commission valuation as of Jan. 1, 1910, corrected to June 30, 1914. Earnings and expenses including all service operated are actual for the first eight months of the year 1914; remainder of year estimated.

TABLE VIII—COST OF SERVICE ON WELLS STREET-FARWELL AVENUE, WAUWATOSA SUBURBAN LINE, (5) YEAR ENDING DEC. 31, 1914
(From Limits of Metropolitan District to Terminus of Suburban Service)

| | Amount | Number of Units | Cost per Unit |
|---|---|---|---|
| Operating revenues (total) | $25,172.10 | ..... | ..... |
| Operating expenses (total) | 26,837.83 | ..... | ..... |
| (a) Costs varying with the car-hour | 4,495.34 | 8,036 | $0.5594 |
| (b) Costs varying with the car-mile | 2,053.09 | 78,965 | .0260 |
| (c) Costs varying with the miles of single track operated | 1,098.07 | 2.59 | 423.9658 |
| (d) Costs varying with the number of revenue passengers carried | 3,449.38 | 663,343 | .0052 |
| (e) Costs of electrical energy-car-mile | 1,800.40 | 78,965 | .0228 |
| (f) Administrative and overhead expense burden | 3,208.59 | Per cent (a) to (e) | 24.88 per cent |
| (g) Depreciation reserve[1] | 3,797.28 | ..... | ..... |
| (h) Return upon tangible property[2] | 6,935.68 | ..... | ..... |
| Deficit | 1,665.73 | ..... | ..... |

[1]4.38 per cent on $86,696.
[2]8 per cent on $86,696.
Actual return upon reproduction cost new.....6.08 per cent
Reproduction cost new, $86,696, is based upon Railroad Commission valuation as of Jan. 1, 1910, corrected to June 30, 1914. Earnings and expenses including all service operated are actual for the first eight months of the year 1914; remainder of year estimated.

fare point at a constant or symmetrical distance from the center of traffic than to extend single lines upon the basis of the cost of separate services to points which are not symmetrical, to the other single-fare zones. The writer has stated in a previous memorandum: "The cost of street railway service is a function of and more or less directly proportional to the distance passengers are carried. With the extension of the city fare zone into outlying territory the average length of ride increases and, correspondingly, the cost of carrying a passenger. In any system a limit must sooner or later be reached where the added haul is supplied at less than cost."

If the Metropolitan District, constituting the city fare limits, shall be determined at points that are equitable for the city as a whole and is approximately symmetrical with respect to the center of traffic, in order to avoid opportunities for claims and discriminations as between different sections of the suburban territory, a distinct advantage is developed by the application of the zone system hereinbefore described.

Such a system eliminates differential fares which are extremely difficult to avoid, as well as discriminatory distances for the same fare, and permits of the substitution of fares on a distance basis substantially the same for all communities. It permits of small increments in the way of added fares for small increments in distances. It equalizes opportunity for local growth and extensions equitably between communities and will avoid the complaint of one locality being built up at the expense of another. It will relieve congestion and ultimately establish a more uniform distribution of population than seems possible under the old flat rate system of longer fares for varying distances wherein development clusters above the city fare limits.

The system is flexible inasmuch as it lends itself to further extensions from time to time along what are now interurban lines, as density of business increases.

Opposition to the zone system developed from those whose fares were increased. Some had difficulty in understanding that the State Supreme Court had held that the Railroad Commission had power to modify rates prescribed in franchise grants. The situation developed an interesting aspect of the differences from a popular viewpoint between downward and upward "regulation."

## MERGING OF URBAN, SUBURBAN AND INTERURBAN TERRITORY

From a territorial viewpoint, ordinarily the city merges into its next adjacent suburb without sufficient changes in the character of community improvements to enable one to determine that he is passing beyond the bounds of one municipal jurisdiction into those of another. The outer limits of suburban communities usually possess little that distinguishes them from the rural community into which they merge. Interurban lines are actually built or operated as extensions of suburban lines, which in turn are extensions of city lines. It is difficult, if not impossible, accurately to define urban, suburban and interurban territory because they merge into one another as day into twilight and night. In fact, it is questionable whether such definition is either desirable or necessary for electric railway purposes.

We have previously indicated that the selection of the suburban and interurban fare problem seems, from a practical viewpoint, to require that street railway fares be fixed so that they will vary more or less closely with the distance traveled, that a central district is necessary to promote more semblance to conditions under which American cities have been built up, and that short zones beyond merge into each other without confusion.

The problem of regulation of rates presents similar

TABLE IX—COST OF SERVICE ON OKLAHOMA-CUDAHY-SOUTH MILWAUKEE SUBURBAN LINE (9), YEAR ENDING DEC. 31, 1914
(From Limits of Metropolitan District to Terminus of Suburban Service)

| | Amount | Number of Units | Cost per Unit |
|---|---|---|---|
| Operating revenues (total) | $109,999.88 | ..... | ..... |
| Operating expenses (total) | 118,059.17 | ..... | ..... |
| (a) Costs varying with the car-hour | 15,208.96 | 27,188 | $0.5594 |
| (b) Costs varying with the car-mile | 9,902.18 | 380,853 | .0260 |
| (c) Costs varying with the miles of single track operated | 6,300.13 | 14.86 | 423.9658 |
| (d) Costs varying with the number of revenue passengers carried | 8,892.45 | 1,710,086 | .0052 |
| (e) Costs of electrical energy-car-mile | 8,683.45 | 380,853 | .0228 |
| (f) Administrative and overhead expense burden | 12,188.01 | Per cent (a) to (e) | 24.88 per cent |
| (g) Depreciation reserve[1] | 20,125.35 | ..... | ..... |
| (h) Return upon tangible property[2] | 36,758.64 | ..... | ..... |
| Deficit | 8,059.29 | ..... | ..... |

[1]4.38 per cent on $459,483.
[2]8 per cent on $459,483.
Actual return upon reproduction cost new.....6.25 per cent
Reproduction cost new, $459,483, is based upon Railroad Commission valuation as of Jan. 1, 1910, corrected to June 30, 1914. Earnings and expenses including all service operated are actual for the first eight months of the year 1914; remainder of year estimated.

TABLE X—ABSTRACT FROM REPORT ON ZONE SYSTEM OF STREET RAILWAY FARES AND METHOD OF COLLECTION OF LEEDS CORPORATION TRAMWAYS, LEEDS, ENGLAND

(This abstract is substantially typical of the practice prevailing for the sixteen European cities referred to in the tabulation.)

Fares:

Rate:

½ mile for ½d.
2 miles for 1 d.
3 miles for 1½d.
4 miles for 2 d., etc.

Workmen's Fares:

Before 7:45 A.M., the rate is half of the ordinary fare. By purchasing a return ticket at the same time a passenger can return over the same section of route as that traveled over in the morning any time after 12 o'clock noon on the day of issue.

Overlapping Fares:

These are in operation and are on the same basis as the ordinary fares.

Collection and Operation:

Conductors upon leaving the depots are supplied with tickets, a punch and way-bills. There are way-bills for each route or line and a total way-bill. The total way-bill shows the number of tickets at the different values (½d, 1d, 1½d, etc.) supplied to the conductor as well as the punch number. This is signed by him as a receipt of punch and tickets. The conductor accepts only cash or tokens (the latter are issued to large employers of labor, etc., at face value only) in exchange for tickets. Each passenger receives a ticket with the value marked thereon and punched opposite to the stage to which he is entitled to travel.

A number of inspectors are engaged for the purpose of checking cars at different points and seeing that all passengers have properly numbered and punched tickets.

No transfers are issued.

Children under twelve years travel at half fare. Children under fifteen going to and from school also travel at half fare.

Accounting:

After completing a day's work the conductor must hand in cash and tickets equivalent to the amount of tickets he received when starting out. He locks his punch and places it in his box, which is sent to head office. The ticket-room staff examines the ticket boxes returned and enters the amount of tickets sold on the total way-bills, which are then forwarded to the punch room where the punch register is compared and added to the way-bill. The conductor's journey way-bills and receipts are then compared with the total way-bills. The number of tickets sold must correspond with the number registered on the punch. The punch has a bell attachment which rings each time it is operated.

General:

| | |
|---|---|
| Route mileage | 70 miles |
| Number of cars | 292 |
| Passengers carried year ending March 31, 1912 | 86,021,943 |
| Population served (approximately) | 550,000 |

Fare Boxes and P. A. Y. E. Method:

No fare boxes are used and the P. A. Y. E. system is not made use of.

TABLE XI—FARE STATISTICS FOR SIXTEEN EUROPEAN CITIES, COMPILED FROM CIRCULAR LETTER SENT OUT BY AMERICAN ELECTRIC RAILWAY ASSOCIATION IN 1912

| County and City | Company | Statistics | Length of Zones (Miles) | Fare per Zone (Cents) | Special Rates | Remarks |
|---|---|---|---|---|---|---|
| Various cities in Great Britain. | British Electric Traction Company. | 400 miles of route..... | 0.23 to 0.5 | 0.5 to 1 minimum | Workmen's tickets. | No transfers mentioned. |
| Birmingham, England. | Birmingham Corporation Tramways. | Single track mileage, 101.46; route mileage, 60.3; 461 cars; passengers per annum, 132,000,000 (25 per cent workmen's rates); revenue, $2,721,600; population served, 850,000. | 2.34<br>3.08<br>4.11 | 2<br>3<br>4 | Workmen's return fraes:<br>2.71 miles—2 cents<br>4.68 miles—3 cents<br>6.15 miles—4 cents<br>8.22 miles—5 cents | Workmen's return fare gives reduced rate for return from any trip started before 7 A.M. on same day. No transfers mentioned. Cash only tender except workmen's tickets. |
| Bradford, England. | Bradford City Tramways. | Miles of route, 56; miles of single track, 100.67; number of cars, 242; population served, 337,000. | 1.6 | 2 | Workmen's tickets. | No transfers. |
| Croydon (Suburb of London), England | South Metropolitan Electric Tramways & Lighting Company, Ltd. | Three routes totaling approximately 13 miles. | 1<br>1.5<br>2.5<br>3<br>4<br>4.5<br>5.5 | 2<br>3<br>4<br>5<br>6<br>7<br>8 | No reduced rate tickets. | Zones are fixed and overlap every ½ mile.<br>No transfers. |
| Leicester, England.. | Leicester Corporation Tramways. | Miles of single track, 19.3; number of cars, 140; passengers carried per annum, 31,314,360; revenue, $633,666; population served, 227,242. | 2.18 | 2 | None mentioned. | Universal 2-cent fare except on two lines where 4 cents are charged. Transfer stages, where fare is 2 cents, are used. |
| Leeds, England.... | Leeds Corporation Tramways. | Miles of route, 70; cars, 292; passengers carried per annum, 86,021,343; population served, 550,000 (approximate). | ½<br>2<br>3<br>4 | 1<br>2<br>3<br>4 | Workmen's tickets, one-half of ordinary rate. | No transfers. Before 7:45 A.M. rate is one-half of ordinary fare. Return ticket purchased at same time permits return over same section of route any time after 12 M. on day of issue. Overlapping fares in force. |
| London, England... | London United Tramways. | Number of cars, 340; track mileage, 55.2; passengers carried, 62,547,128. | 2¼<br>3<br>4½<br>5¼<br>6 | 2<br>3<br>4<br>5<br>6 | None mentioned | No transfers except in case of two short feeder lines. |
| Aberdeen, Scotland. | Aberdeen Corporation Tramways. | None given | 2-5<br>Center of city to any terminus. Across city. | 1<br>2<br>4 | Season tickets. | Three months' season ticket costs $3 for 700 yd. 12 cents extra for each additional 100 yd. No transfers. |
| Cardiff, Wales..... | Cardiff City Corporation. | Miles of single track, 33; number of cars, 130; passengers carried, 1911, 2,586,421; population served, 183,000; revenue, 1911, $610,500. | 1.44<br>1.99<br>2.72<br>3.33<br>4.00<br>4.78 | 2<br>3<br>4<br>5<br>6<br>7 | Workmen's tickets. | Transfers as understood in America not used. Transfers used which permit people to ride one-half mile and take another car in another direction, tendering transfer ticket in payment. |
| Glasgow, Scotland.. | Glasgow Corporation Tramways. | None given. | 2.28 | 1 | None. | No transfers. |
| Halifax, Nova Scotia | Halifax Corporation Tramways. | None given. | .35<br>1.35<br>2.49<br>3.73<br>5.05<br>6.30<br>7.64 | 1<br>2<br>¼<br>6<br>8<br>10<br>12 | Workmen's tickets:<br>2.70 miles, 2 cents<br>4.99 miles, 4 cents<br>7.47 miles, 6 cents<br>10.11 miles, 8 cents<br>12.61 miles, 10 cents<br>15.29 miles, 12 cents | Transfers good for 1.7 miles cost 2 cents. |
| Paris, France..... | Paris Tramways. | Miles single track, 52.7; passengers carried, 1911 in city, 1,183,000; out of city, 20,474,000; city receipts, $1,407,088; out of city, $347,203. | Suburb Section<br>1.6<br>1.94<br>City Section<br>0.62 to 2.36<br>One section<br>Two or more sections | <br>2 or 1*a*<br>3 or 2<br><br>3 or 2*a*<br>4 or 3 | Reduced fare in morning hours. | Double fare is charged late at night. No transfers are used. |
| Brussels, Belgium.. | Brussels Tramways. | City double track mileage, 64.48; suburban double track mileage, 14.88; passengers carried in 1911, 119,240,102; cars, 610. | 0.93 minimum<br>1.80 maximum on line.<br>Suburban 0.93 minimum each extra 0.47 mile | 2<br>3<br>2<br>1 | ..... | Transfers cost 1 cent per 0.93 mile or less on section line; or 2 cents for greater distance. |
| Berlin, Germany... | Greater Berlin Street Railway. | Comprises Berlin, Charlottenburg and north, south and west Berlin suburban lines. | None given | 2½–5 | Monthly passes are sold. Cost varies with number of lines on which used. | Loads are limited except in the event of more than normal travel. |
| Hamburg, Germany. | Street Railway Company. | ..... | 2.2<br>4.4<br>Over 4.4 | 2½<br>3¾<br>5 | Workmen's cards; weekly or monthly season tickets. | Free transfers must be used on first available car. |
| Vienna, Austria.... | Municipal Street Railway. | Miles of single track, 155.65; motor cars, 1,230; trailers, 1,419; population, 2,064,600. | Two zones<br>Four zones<br>More than 4 zones | 3<br>4<br>6 | Monthly and semi-annual passes 4.80 to 24 respectively. | Transfers are in use. |
| Amsterdam, Holland | Amsterdam Municipal Railways. | Greatest length for one line is about 5.6 miles; there are 14 lines of which four are over 3½ miles in length. | 3.53 or less<br>3.53 to 5.58 | 3¾ | Tickets, books at 6 cents per ticket. Before 7:30 A.M. fare is 3 cents; by paying 6 cents before 7:30 A.M. a passenger can make a second trip (same day before 8 P.M.) equal in length to a 7½-cent ride. Double tickets are issued for 10 cents, for which two 7½-cent rides can be had. | No transfers. |

NOTE.—*a*, Fares given in first column for Paris are first-class fares; in second column are second-class fares.

aspects. It seems improper that an arbitrary line should be drawn attempting to mark the end of urban territory and the beginning of suburban territory, or the end of suburban and the beginning of interurban territory. Were such a line drawn, its location cannot be permanent on account of the changing character of the development of the community. If no such arbitrary line can be properly drawn, it follows that there is little logic in drawing a line beyond which the profits, if any, arising from city operation shall not be extended.

The extension of the city fare into suburban communities for the purpose of distributing population and lessening congestion presupposes the existence of suburban lines already built or whose construction is contemplated. The only inducement that can ordinarily be offered for the construction of a suburban extension is that such construction will insure the permanence of the city fare.

Interurban lines open up additions to suburban territory and make interurban territory more directly and conveniently tributary to the suburban and central city. They thus share in the same responsibilities and partake of the same relations as exist between suburban lines and the city lines of which they are extensions.

If these statements are true, it logically follows that the profits of the city lines should be extended not only over their suburban extensions but also over the latter's interurban extensions. Such a policy would seem to do injustice to no one or group of individuals, and when properly applied should result in the gradual extension of electric railway facilities so much desired by rural communities. In fact, the application of such methods through the medium of regulation by commissions would do far more for the development of communities than many other schemes now apparently regarded as of great importance by legislators.

The results of the present computations as to the cost of service of the suburban lines on the Milwaukee company's property corroborate similar figures for prior years and lead to the conclusion that such deficits must be made up of surplus from urban traffic. A study of the cost of service on the suburban lines indicates that such lines, taken by themselves, are not self-sustaining.

It is believed certain that the most desirable plan is a consistent application of the zone system to the suburban lines, based approximately upon the principle of uniform fares for uniform distances, coupled with a central metropolitan district within which a unit fare is charged sufficient to absorb any suburban deficits and still give a reasonable return upon the entire investment. Such a plan will eliminate discrimination, equalize opportunity for local growth and expansion, relieve congestion and ultimately produce a more uniform distribution of population.

The zone system herein described has been demonstrated to be capable of operation in practice equally, if not more, free from the usual complications of fare collections.

### SUMMARY AND CONCLUSIONS

The following brief conclusions may be drawn from the study which has been made of the zone system of fares as practically applied in Milwaukee:

(1) An analysis of the data herein set forth indicates that suburban street railway traffic is not in itself profitable when viewed from the standpoint of the investor, the public service corporation and the regulating commission.

(2) The present community development of most American municipalities is such as to prevent in a practical way the installation of a system of fares which will result in reasonable returns upon suburban lines.

(3) The future profitableness of suburban lines must lie in the restriction of the allowable ride for a single fare and the gradual application to the extended metropolitan area of a zone system somewhat along lines described herein. No difficulties are encountered in the practical operation of such system and the American public will eventually recognize the equity of such a plan.

## The Daily Issues

A letter from a subscriber to this paper received on Monday of this week says: "I have just returned from the Atlantic City convention, and after what I saw there, it is impossible to do anything but send my subscription for the coming year. Your part of the exhibit was great, and I feel that I must read every issue of your journal during the coming year." This letter and inquiries at the convention in regard to the method in which the daily issues were published last week suggest that a brief account of the plan followed would be of interest.

The issues for Tuesday, Wednesday, Thursday and Friday of the daily issue of the ELECTRIC RAILWAY JOURNAL were printed in Philadelphia, that of Saturday was printed in New York. Philadelphia was chosen because New York was too far away and the printing facilities in Atlantic City were not adequate for the work. The manuscript was sent to Philadelphia by special messengers during each day up to about seven o'clock, and the news thereafter was transmitted by telephone directly to the printing office. Twenty-one persons were brought on from the New York or branch offices of this paper to assist in this work. Part of this force remained continuously in Philadelphia. The others worked in Atlantic City, and one or more of the editors went to Philadelphia each night to read the final pages.

The force required to carry the manuscript to Philadelphia and that in the printing office working exclusively on the daily issues consisted of about forty men and boys, making altogether about sixty-one persons engaged directly on the work. The forms were usually ready for the press about midnight, and enough copies were printed quickly to supply the needs in Atlantic City. More time was taken to print the rest of the edition, but all of the sheets were sent to New York in time to be bound and mailed to the regular subscribers on the day of issue.

The expenses of publishing a paper under these conditions and in a rented printing office amounted to considerably more than if the daily issues had been published in New York, and only a portion of this expense was covered by the advertising printed in the daily issues. The remainder represents the contribution of the ELECTRIC RAILWAY JOURNAL to the success of the convention in supplying a prompt and reliable report of it to the railway men at Atlantic City and at home.

## Industrial Welfare and Efficieny Conference

In accord with the unanimous vote of the first Pennsylvania Industrial Welfare and Efficiency Conference held in Harrisburg last year, John Price Jackson, Commissioner of Labor and Industry, has issued a call for a second conference to be held in the state capitol at Harrisburg on Nov. 17, 18 and 19, 1914. This conference is held under the auspices of the Pennsylvania Department of Labor and Industry and the Engineers' Society of Pennsylvania. The purpose of the conference is to enable the employers and employees together to work out the great problems before them with reference to increasing the welfare of the employees and the prosperity of the industries.

# Appraisals of Ohio Public Utilities

The Joint Committee on Valuation for Ohio Public Utilities Formulates General Principles for Guidance of Companies in Making Inventories and Appraisals as Required by Commission Regulation in that State

On March 19, 1914, the Ohio Public Utilities Commission issued Order 176 and on April 25, 1914, a supplemental order, both calling for inventories and appraisals of the property (owned, operated or leased) of all public utilities in the State. At a meeting on Aug. 14, 1914, of representatives of the various utilities in the State, a committee was appointed to formulate principles applicable to all utilities under the commission's rulings. The members were as follows: Robert Lindsay, chairman, vice-president and general manager Cleveland Electric Illuminating Company; Frank C. Dunbar, district attorney American Telephone & Telegraph Company; Allard Smith, general manager Cleveland Telephone Company; Rollo R. Stevens, Ohio State Telephone Company; J. C. Martin, president Ohio Water Works Association; F. W. Coen, vice-president and general manager Lake Shore Electric Railway, and M. B. Daly, president East Ohio Gas Company. This committee, proceeding upon the assumption that the "reproductive cost new, less depreciation" method was the one called for by the commission, recently published its report, which is abstracted below.

### Interpretation of Scope of Order

Although the terms "inventory," "appraisal" and "valuation" were used interchangeably in Order 176, the committee felt that the evident purpose was to secure not only a complete inventory of the items of property of each utility, but also a valuation or appraisal of the property. By property was meant not only the plant, in the largest sense of the word, but also the business. To the cost of physical property and overhead charges must be added the cost of establishing the business and any other elements which enter into the total value of the property. The term "net value" used by the commission refers simply to the depreciated value of the physical property without regard to overhead charges or to the business of the utility.

### Use to Be Made of Data

No announcement has been made of the use which will be made of the inventories and appraisals filed with the commission. It has a right in the case of any particular company to proceed at once to make a final valuation or simply to retain the data for future use. In the case of an immediate final valuation, the data already secured would constitute *prima facie* evidence relative to the value of the property as of the date named. The report states, however, that even in the absence of a valuation by the commission, it is possible that an effort might be made to use the inventory and appraisal as evidence against the utility in any proceeding relating to the fixing of rates, capitalization, sale, condemnation, taxation, or any other proceeding that might take place in the future.

### Property Used and Useful

All property, whether or not used and useful, is to be included in the inventory and appraised upon the basis of its reproductive costs as of a certain date. "Used and useful" property embraces the following:

(1) Property regularly in service in the course of operation.

(2) Property not regularly in service, but which, owing to the wide range in demand, is actually needed and used at some time.

(3) Property which of necessity may seldom if ever be used, but which prudence and good management deem essential as a part of the reserve capacity of the plant and as a safety measure to guarantee constant service.

(4) Property which good management and business judgment consider it necessary to acquire in advance of immediate need for the sake of economy, etc.

(5) All other property and property rights devoted to the public use.

The report states that overhead costs should be applied to all classes of property according to their nature, without regard to whether or not such property is used and useful.

### Reproductive Cost New

According to the committee report, the cost of reproducing the property of a utility is made up of: (1) the cost of reproducing the plant, and (2) the cost of reproducing the business which was attached at the time of investigation. The reproductive cost new of such property should take into account all physical, municipal, industrial and other conditions existing at the time which affect the cost of labor, materials, engineering, administration, financing and securing of business, together with all other items which enter into the reproductive cost new of the plant and business as an entirety.

The types of units actually in use should be taken and no theoretical substitution should be made of units of a different type which might be capable of rendering equal service. The material prices and labor costs should be fair and reasonable, due allowance being made for market fluctuations and any abnormal conditions. In the case of the latter, fair prices may be determined by means of a trend curve going back far enough so that the trend price would not be materially affected by going still further back. The period for which the trend curve is plotted has no relation to the length of time it would require to reproduce the property.

### Period of Theoretical Reproduction

The owner of public utility properties must bear the cost of interest on money expended for reproduction of both plant and business from the time it is raised until such reproduction is complete and also the cost of insurance and taxes over the same period. In order to arrive at the proper amount of interest, insurance and taxes to be added to the reproductive cost, it is necessary to estimate the reasonable period that such reproduction will require. The reasonable period varies for different utilities and properties of different size, and the committee expressed its inability to estimate it at all.

It is stated, however, that there is a general tendency to assume a much shorter period than is actually required. The period should begin when the proposition is first conceived and follow through all the successive steps to completion. The date certain to be taken for the completion of the plant and business should be July 1, 1914, as of which the inventory and appraisal are made, and the period of theoretical reproduction should be such period prior thereto as it would require to complete the plant and business by that date. Although during the earlier part of this period the principal expenditures will be on account of construction, expenditures incurred for establishing business will begin at

some time during the period and proceed simultaneously with construction expenditures until the end.

### OUTLINE OF INVENTORY

In order to comply with Order 176, the committee believes that the inventory should include:

I. Reproduction cost new of: A. Preliminary work; 1, preliminary investigation; 2, organization of company; 3, cost of financing; 4, franchise. B. Physical plant, consisting of: 1, land; 2, rights-of-way and water rights; 3, buildings; 4, generating or pumping plant, exchange equipment, etc.; 5, distribution and transmission systems, track, etc.; 6, tools, teams, vehicles, etc.; 7, furniture and fixtures; 8, working capital; (a) cash and other quick assets; (b) stores and supplies; 9, other items of physical property. C. Established business: 1, cost of organizing and training operating, selling and clerical forces; 2, cost of selling service; 3, any other costs of attaching business.

II. Any other elements of going value or good-will.

III. All other elements of value.

The foregoing items are more specifically defined in succeeding paragraphs. Preliminary investigation, the report states, should date back to inception, but should exclude promoters' compensation, which should come under organization. Organization should cover promotion, incorporation and other legal expenses, and preparation of stock and bond issues and other documents. Discount on bonds, however, and expenses incident to floating loans should come under cost of financing. Only the amounts actually paid for franchises should be listed.

### PHYSICAL PLANT

Under the heading "land" should be given the original cost, including purchase price, condemnation costs, brokers' and attorneys' fees, surveying costs, recording fees, liens on the property, payments for damages to abutting property and cost of grading land when not done in connection with buildings. The date and conditions of acquisition should also be given. The value as of July 1, 1914, should be given for each parcel, with comparative figures for contiguous property, and the authority for such figures. Additional value by reason of present use should be recorded, consideration being given to (1) location with reference to center of distribution, (2) location with reference to transportation facilities, (3) suitability of property for future growth, and (4) any other natural advantage, such as availability of supply of condensing water, etc.

The heading "rights-of-way" should include the cost of reproducing all rights-of-way acquired for the location of poles, wires, cables, conduits, pipe and track, whether such rights-of-way consist of land owned in fee or of easements acquired by permanent grants or through revocable licenses, oral or written. The cost items concerned are the purchase price or award and expenses of condemnation proceedings, the cost of obtaining consents, the salaries and expenses of right-of-way agents and others employed in securing such grants, recorder's fees and all other expenses.

The cost of reproduction of each building owned by the utility should include the preliminary costs and the contractor's charge for reproducing the building. The latter should be based on one or more competent contractors' estimates, which should show quantities and unit prices and take into account proper allowances for delays due to strikes or other causes, contractor's profit and his costs to meet payments prior to final settlement according to the usual plan. In making his estimate the contractor should not omit those elements of cost which, while not apparent in the finished building, are necessarily incurred in connection with its construction. Among such items are demolition of old buildings, excavation, pumping, bracing, protection of streets and adjoining buildings, cost of estimate, traveling, insurance, bond, fees and permits, stair guards and lights, tests, protection of masonry and other work, temporary office, telephone, photographs, sheds, temporary toilets, temporary heat, temporary inclosures, watchmen, omissions and contingencies. Architects' and owners' supervision, unforeseen expenses not included in the contractor's estimate, and the cost of grading, sidewalks, fences, etc., in connection with the building are also elements of the reproductive cost.

The allowance for working capital should be sufficient to care for emergencies and contingencies as well as for the ordinary expenses of operation. It is impossible to lay down any definite rule for estimating the proper amount to be allowed for this item. It must be determined by each utility with regard to its ordinary outstanding indebtedness, its ordinary accounts receivable and accounts payable, its methods of collection, the natural risk of the business and the condition of its credit.

### UNIT COSTS

In estimating unit costs it should be remembered that plants are always constructed piecemeal, with consequent greater cost. The following elements, says the committee, enter into the cost of any unit: 1, Cost of unit f.o.b. point of supply; 2, cost of purchasing; 3, cost of inspection; 4, freight switching, expressage and cartage; 5, cost of unloading; 6, cost of preparing unit for use; 7, cost of hauling to point of use, whenever different from point of delivery; 8, shop, storeroom or yard charges; 9, labor; 10, tools and appliances; 11, incidental material; 12, breakage, loss and waste; 13, construction superintendence; 14, employers' liability insurance; 15, public liability insurance.

### OVERHEAD CHARGES

The costs which should be allocated to the units have been outlined above under unit costs. Overhead expenses, which should be allotted as a gross sum or apportioned to large groups of units, include legal expenses, administration and supervision, engineering, insurance, taxes and interest during reproduction, contingencies, and omissions and oversights. No fast line of distinction, however, can be drawn between these two classes. Each utility must take care to avoid duplicating in the gross overhead any items which have been allocated to the units. Apportionments among the groups of units may be advisable where one or more of the overhead charges apply in varying percentages to the different groups of units, but caution must be used that apportionments are made correctly.

### APPORTIONMENTS

When two or more utilities are operated by a single company or portions of property are used in common, the value of the jointly used property should be apportioned among the various utilities according to the service requirements of each property. Where the utilities are operating in more than one political subdivision, apportionment should be made according to the service requirements of each subdivision or rate area.

In the case of joint ownership of poles, the reproductive cost should be apportioned on the basis of the respective rights. In the event of joint occupancy of poles, the reproductive cost should be apportioned as though the pole were jointly owned, if the occupying company has been granted a permanent right. If the occupying company has a right terminable at the will of the owner, whether on a rental basis or otherwise, and has certain attachments fastened to the pole, the reproductive cost of the owner's property should include the entire reproductive cost of the pole and its own atachments, while the similar cost of the occupy-

ing company's property should include the reproductive cost of its attachments and also the reproductive cost to it of securing the permits, contracts, rights-of-way and all other costs involved in reproducing its rights and physical property.

### COST OF REPRODUCING THE BUSINESS

The cost of reproducing the business should include all the necessary cost of attaching the business and reproducing the income of the utility as of July 1, 1914. Some of the elements of expense which enter into such cost are as follows: 1, Organizing and training the operating force; 2, organizing the clerical force; 3, organizing and training the selling force; 4, securing customers, including expenses of solicitors, advertising, printing and free inducements; 5, commercial engineering; 6, printing forms, records, books, schedules and directories, and 7, rent of offices.

### DEPRECIATION

Inasmuch as Order 176 requires that depreciation be shown, the report briefly explains the straight-line and the sinking-fund methods, but finds both inferior to actual inspection. Attention is called to the distinction between depreciation and depreciation reserve, the latter representing an amount accrued out of earnings or set aside out of surplus in anticipation of the occurrence of depreciation. In the words of the report, "It is important to note that neither the amount in the depreciation reserve nor the amount which ought to be in such reserve is in any way a measure of the depreciation or loss of value which has already taken place, nor does it afford a measure of the rate at which depreciation or loss of serviceability will occur in the future."

There is no direct connection or relation between the depreciation of any physical units of property and the preliminary and overhead costs which pertain to the property as a going concern. For instance, if some poles or sections of rails, cables or conduit depreciated so that they must be replaced, it does not follow that the values resulting from general engineering, legal, financing, organization and other such costs, have deteriorated to the same extent. The opinion of the committee is that depreciation in preliminary and overhead costs, if it exists at all, is so small that it is impracticable to compute it, and that the utilities are justified in ignoring it in making up their inventories.

### OTHER METHODS OF VALUATION

In conclusion the committee points out that reproductive cost new less depreciation is not the only evidence of the value of a utility, and recommends that the following clause be inserted on the last sheet of the inventory above the signature:

"This inventory and appraisal has been made in an effort to comply in all respects with the commission's Order 176, by listing the items of property owned by this company and stating their reproductive cost new less depreciation. The company reserves the right, in any appropriate proceedings involving the value of said property or any part thereof, to offer any other or additional evidence of value."

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The consulting engineer of the Brunswick-Coburg (Australia) Tramways Trust has submitted his report on the construction of the line, the cost of which will be $673,052. It is anticipated that tenders for most of the work will be called for this year. A committee, consisting of members of the Melbourne City Council, the Trust, and the Brunswick and Coburg Councils, is considering the report.

## H. H. Porter on Utility Earnings

According to H. Hobart Porter, of Sanderson & Porter, New York, the average earnings of public utility companies are holding up well under present disturbed financial conditions. In talking with a representative of the ELECTRIC RAILWAY JOURNAL, he spoke particularly of the affairs of the American Water Works & Electric Company, of which he is president, and also of other utilities in which he is interested.

Mr. Porter said that while the rate of increase in the gross revenues of the operating properties controlled by the American Water Works & Electric Company is smaller than in previous years, it is still good. Since May 1 the rate of increase over the corresponding period of 1913 has been nearly 50 per cent better than the similar increase of 1913 over 1912. The company includes many properties furnishing different classes of utility service. Some of these, on account of special influences arising from the disturbance of industry as a result of the war, show actual decreases in business. General observations seem to indicate that the slackening of industry affects transportation companies very early. Steam properties, which are so largely dependent upon freight for their great volume of revenue, are affected first. Electric transportation, furnishing the local service in cities and short-haul service between communities, is affected to a lesser degree. Electric central stations are affected to a still smaller degree except where a large amount of the consumption is required in manufacturing industries that are closed down. The receipts of water companies have a tendency in times like the present to show only a decreased rate of growth rather than an actual falling off in business.

One development of the situation which Mr. Porter mentioned with pleasure was the fact that in most cases municipal and other public authorities have co-operated in every way in helping the properties to make the best of the conditions imposed upon them by the war, such as the postponement of construction outlays which the present financial conditions make imperative. Public utilities, Mr. Porter said, are not affected so much directly by the war, as they are indirectly through the prevention of the sale of securities to provide funds for capital requirements. There is also an indirect effect arising from the demoralization of the market for cotton and the reduced consumption of iron and steel products. In some sections of the Northwest and the great Central Western States, however, the agricultural communities generally are exceedingly prosperous, wheat selling for more than twice its cost of production.

Mr. Porter added that the present crisis seems to have demonstrated some of the principal advantages of holding company ownership of public utilities as compared to independent ownership. An investor in the securities of a holding company has the added protection arising from diversity in the ownership of operating plants. The frequent result of this condition is that the decline in earnings of a plant in one locality is overcome by increased earnings in other plants. With properties situated in different localities and carrying on different classes of business, a large reduction in the total operating revenue seems to be less likely to take place. Moreover, companies have found it possible to secure capital for urgently needed improvements for controlled properties at times when independently owned utilities have not been able to do so.

One of the most important pieces of new construction work which Sanderson & Porter are carrying on at present is the hydroelectric development at Cohoes, N. Y., for the Cohoes Company. None of the public utilities in which they are interested is undertaking any con-

struction work, except such as is absolutely necessary or was under way and almost completed.

When Mr. Porter was asked his opinion as to the duration of present conditions, he said that if the expectation of the best European observers for a long war was borne out by events, present conditions would have to continue or possibly grow worse. If, however, their prediction of a comparatively long war should not be accurate, this would have an immediate and overwhelming influence over all other considerations. In any event, the increased cost of capital must be marked for some time, and this must have a very radical effect on the future course of public utility financing. All over this country rate-regulating public bodies have made decisions on the assumption that capital could be had at rates substantially less than those experienced in the initial promotion of utilities. If utilities are to continue to grow under prevailing conditions, however, a much more liberal attitude must be taken by public authorities in reference to rates of return on capital.

## Report of Latin-American Trade Committee

That industries of the United States will be seriously injured by loss of Latin-American trade if the restriction of commercial credits is not remedied, is one of the conclusions of the Latin-American Trade Committee recently appointed by Secretary of Commerce W. C. Redfield. The committee is headed by James A. Farrell, chairman of the National Foreign Trade Council, and consists of representatives of manufacturing, commercial, transportation and financial elements engaged in, or affected by, foreign trade.

The committee finds that the sister republics are turning to the United States for funds to carry on industrial development and that the greatest opportunity lies in systematic preparation for extension of trade when peace restores normal conditions rather than in hasty invasion of southern markets. Dependence upon London banking is sapping American foreign selling power. While the committee admits that trade with South America must partly depend upon London exchange as long as the republics owe heavily to Europe, it urges that in the mutual interests of all the American republics new credit machinery be created to escape this dependence as much as possible. The committee considered the proposed establishment of a "co-operative exchange" or merchant's clearing house for Latin-American trade. On account of the difficulty of obtaining co-operation, the necessity and difficulty of standardizing credits, the seasonal variations of shipments of South American produce and the expense, the plan was pronounced impracticable.

The committee believes that the present disorganization of the trade of the United States with Latin America may best be remedied and placed on a permanently satisfactory basis under the following plan:

(1) By the establishment of a dollar exchange, by the ultimate creation of a discount market, and, pending the establishment of a discount market, by the extension of adequate accommodation by banking institutions and the establishment of reciprocal balances in the United States and in Latin America for financing Latin-American trade; and (2) by the perfection of American selling machinery through furnishing additional support to commission houses familiar with Latin-American business; by forming associations of merchants and manufacturers to be jointly represented in Latin America, and by obtaining information as to the possibilities of developing retail stores in large Latin-American cities.

The committee believes that this country is hardly in a position to undertake considerable investments in South America at the present time, but industries with an already considerable trade at stake may well consider the necessity of protecting that trade by obtaining for their customers some relief from the present stringency. Such investments, if judiciously made, would yield an ultimate fair return and meanwhile provide a market for American materials which cannot now be sold.

## Panic Economies Discussed

At the monthly meeting of the New York section of the American Society of Mechanical Engineers held on Tuesday, Oct. 20, the topic of the evening was "Panic Economies." A paper dealing with that subject was presented by Frederick A. Waldron, who stated that the causes of panics were, in general, suspension of credit, the calling of loans on high-grade collateral thus affecting commercial paper, and curtailing employment in many industries. Lack of work, in consequence, involved many non-producers who drew upon the banks to tide themselves over the depression, and this made the banks increase their cash holdings, producing further limitations in the ability to obtain credit.

Mr. Waldron pointed out the necessity for manufacturing firms to place themselves in a sound condition financially at the beginning of a panic by increasing their cash resources. He outlined the need for care in reducing running expenses, especially with regard to reductions in working forces, and advised the elimination of all non-productive work, experimental operations and the like. All doubtful stock should be turned into cash and unfinished material completed and sold. Necessary construction and engineering work might be carried on to advantage by co-operation with the engineering forces of other companies. In conclusion, the lessons to be learned from the present industrial depression were that the nations of the world were becoming interdependent, that our factories were not prepared to meet the demands of new markets and that the attitude of unwillingness to change standards must be abandoned if the trade of countries such as South America was to be obtained.

In the discussion which followed, William Kent referred to the panic of 1872 which came after the period of extraordinary expansion after the civil war and which was brought about by a single failure, the day rate for labor dropping from $1.75 to 87 cents in a few months. This panic lasted for several years, but in 1879 people suddenly awoke to the fact that the panic was over, and expansion began again. The reaction was almost as sudden as the advent of the panic, and the speaker felt that the recovery from the present depression was going to be just as rapid and just as unexpected. Every panic had been followed by a boom because things wore out and had to be replaced. Mr. Kent advocated a freer issue of emergency currency, citing the carrying on of the country's business throughout the civil war through the large issues of greenbacks. He objected to the maintenance of cash reserves in emergency times, stating that the reserves were intended to be used during panics. He advocated loaning money at high interest rates on commodities such as copper or cotton, so that the people could spend money and get things going again. He suggested that if everyone would pay his debts instead of hoarding money, panics would be reduced in severity.

During the discussion the point was raised that one great difficulty opposed to our obtaining the South American markets was that our efforts have always been along lines of labor-saving devices while in South America labor is very cheap. The United States, therefore, would have to revolutionize South America's methods before being able to sell machinery there.

# COMMUNICATIONS

## Broken Bolts in Built-Up Crossings

UNION TRACTION COMPANY OF INDIANA

ANDERSON, IND., Oct. 17, 1914.

To the Editors:

Your editorial of Sept. 12 concerning "Broken Bolts in Built-Up Crossings" calls attention to a problem of especial interest to electric interurban railways. Bolts and joints come loose when any locking device is used, probably from two causes. The first and by far the greater cause is the fact that the joint bars when placed are not driven in position as firmly as is possible, or the bearing at all points is not uniform. In this condition the vibration and natural deflection of the track, due to the operation of trains, will cause sufficient working to allow the joint bar to assume a different position. This will allow the bolt to become loose or, in other words, will require a shorter bolt length, and as a result the nut will be loose and require a second tightening. The second cause is that if a nut is of sufficient strength it can be tightened so as to make the bolt stretch. If the bolt does actually stretch a permanent set is obtained in the steel of the bolt. This means that the elastic limit of the steel has been exceeded and a new bolt should be installed.

If a bolt becomes loose from either of the above causes, a locking device which will continue to hold the nut tight on the bolt, even though the bolt is loose in the joint, is most desirable. With this type of lock the nut cannot work off under the vibration of trains and it may be retightened, and, in the meantime, will hold the joint bar in place. Of course all nuts have to be tightened occasionally on account of the wear in the joint. On the other hand, many locking devices, when the bolts loosen from the causes already mentioned, free the nut, and it gradually works off the bolt. Soon after the bolt will come out of the joint, on account of the vibration, and other bolts soon follow, with a possible dangerous condition resulting.

LOUIS A. MITCHELL,
Superintendent of Roadway.

## Indexing Technical Information

NEW YORK, Oct. 15, 1914.

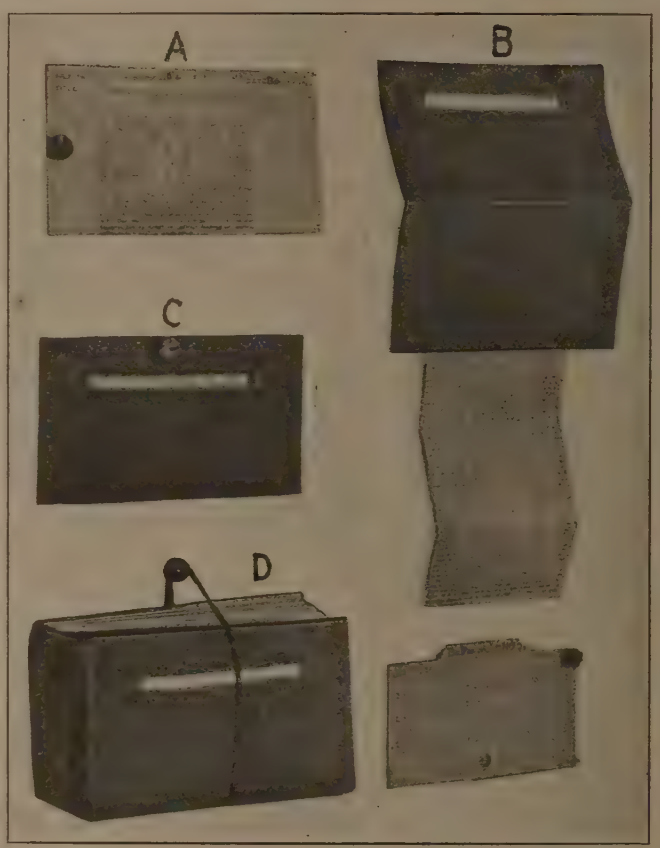
To the Editors:

The abstract of Mr. Alvord's article on "How to Use the Technical Journal" in your issue of Oct. 3 gives points of vital interest to every engineer, for the progress of any technical art is heralded in the technical press long before the facts are consolidated in stable form in text and reference books. I started some twenty years ago to index current literature pertaining to the electric transportation and lighting arts and tried faithfully every method which I knew—card indexing, scrap books, files, etc. When it came to getting working results from this material confusion arose. In carefully analyzing the causes of the difficulty it developed that an alphabetical index was a delusion and a snare. In the context of an article lies its value, and this context gives it a fixed place in any general scheme of technical knowledge as conceived in the mind of the indexr.

The most suitable index must be the creation of the user, but there are several underlying principles which, if understood, will smooth the way. In the first place, the whole subject to be indexed must be divided into suitable groups. For example, let us divide material on electric transportation under ten headings, taking them in the order of their natural occurrence in the growth of an electric railway property as follows, using the Dewey decimal system of numbering: .0, historical; .1, general description; .2, finance; .3, engineering; .4, operation; .5, power station; .6, transmission system; .7, equipment; .8, track, and .9, maintenance.

Under this rough classification we can commence to crudely sort out our information. Each individual compiling an index associates certain groups of facts together, and, if he will expand his index according to this preconceived correlation of facts it will not tax his memory to recall the proper location of desired data. The method of expansion by the Dewey decimal system permits subheadings to be interpolated *ad libitum* between consecutive decimal numbers and the growth of the index does not disturb the original decimal classification.

Another general principle which I have found useful in gathering data under groups, is that the physical location of the general data should be considered and the information should be filed in the class of physical material with which it is naturally associated. For instance, signal systems would go under track; copper wire tables under transmission, etc. This cuts down the number of cross-references required.




INDEXING TECHNICAL INFORMATION—EXHIBIT OF SAMPLE FILING DEVICES

Under the head of general descriptions of systems of electric transportation falls a large portion of general technical information, and the matter contained may fall also under any or all other general divisions of our index. In order to systematize this disorder I discovered that nine out of ten men will remember the geographical location of the event, structure or system to be inquired into and from this psychological peculiarity I found it desirable to arrange general descriptive matter geographically, giving consecutive numbers to all towns in order of an alphabetical state list of population of five thousand and over. As a short cut to this where electric railway topics are to be classified one can use the "Electric Railway Directory," in which every railway system in this country and Canada has been assigned a number. In my index each town has a card

of its own and if any information appears regarding a railway system centering in a town, the index number of the data is entered on the card and under headings such as "transportation system," "power station," "equipment," etc. The clippings are filed in geographical order under the index number for the class, which gives the most useful arrangement.

So much for general system of indexing. Next comes the getting of this matter collated and indexed. Without going into all the features of the different methods I shall explain one that I have been using for the past sixteen years. I have more than 40,000 clippings sorted so that they are useful, and the railway index has expanded into more than 980 divisions. To save the regret of having destroyed what may be wanted later I clip everything, although many topics which afterward become important at the time of filing seem valueless. Two copies of every periodical clipped are required. The accompanying illustration shows the methods used in filing: *A* is a standard library card 3½ in. x 6 in. All cuttings not longer than 6 in. are pasted on cards of this size, and by turning the clippings over the lower edges and pasting them on the backs, both sides of the cards can be used. The title is pasted high enough to be used for the title of the clipping. Where an article is longer than 6 in. the folder is used, as shown at *B* and *C*. A slit is cut across the folder long enough to allow the clipping to protrude through and show the title. The clipping is pasted to the folder and folded up so as to be contained within it. Rubber stamps for the different journals clipped and the dates are used to reduce clerical work, which can be done by an office boy in his spare time. All that is required of the maker of the index is that he fill in the index numbers. With a little instruction any intelligent assistant can sort clippings into general classes, when they can be indexed rapidly.

The folder *D* contains all of the cuttings from the ELECTRIC RAILWAY JOURNAL for May 23, 1914. The small card used for geographical locations is shown in the lower right-hand corner. I use different colors of folders and cards for different years so as to give a chronological idea of the date of the information.

ALBERT B. HERRICK, Consulting Engineer.

## A Good Word for the Card Index

PUBLIC SERVICE CORPORATION OF NEW JERSEY
NEWARK, N. J., Oct. 15, 1914.

To the Editors:

From the special librarian's point of view, the preservation of technical information in an accessible form is of the highest importance. But even with every facility at hand, it is a difficult problem to get the most out of a collection. For the average person, the cost of binding volumes of a journal, and the space required for keeping a file of any length prohibit this method of handling magazines; while the fact that few journals publish cumulative indexes covering a longer period than six months or a year would seem a very real barrier to the use of the index brought out with each volume. In addition, material published while the volume is still running, is unrecorded unless noted in some manner at the time of reading. A personal index, therefore, is necessary, both to keep a cumulative record of information, and to cover very recent publications.

To do away with indexing each article as read, and with cumbersome bound volumes, the vertical file may be resorted to, and separate articles arranged according to some definite plan. To do this without a card index, however simple, as Mr. Alvord advocates in his recent paper, is almost an impossibility. In the first place, if alphabetical arrangement under subjects is employed, we find that few articles have an unmistakable heading. Many might as readily be filed under several different heads, and unless a close watch is kept, there is always the possibility of filing similar material under slightly different topics. Thus in referring to an article, one can never be sure just what phase of the subject presented itself most prominently at the time of filing, nor that all the material on a given subject has been withdrawn for reference. In this connection, it would seem that a card index is an indispensable adjunct to the office file, for cross-reference purposes, at least, and to secure a uniform, easily consulted record of subject headings used. For instance, it is desirable to know at a glance whether abstracts or articles are filed under street railways, electric railways, transportation, interurbans, or any one of numerous titles more or less synonymous for this class of information. A simple cross-reference card, referring from each of these headings to the one preferred will settle at once where in the file all of the material on that topic will be found.

A question on which Mr. Alvord has not touched, but which must be met, is that of arrangement alphabetically by subject or according to a decimal or other classification. The former is simpler but usually separates allied, but slightly different, subjects. A decimal classification, such as "An Extension of the Dewey Classification Applied to the Engineering Industries," by L. P. Breckenridge,* while requiring some little care in application, brings all related information together, and permits indefinite expansion. Here again, a card index is needed to indicate the class number of article or abstract.

Whatever method of filing is used, however, one is lead to the same conclusion—that the readiest means of recording the location of data with the minimum of effort and the greatest accuracy is by some form of card index.

H. I. BREWER, Librarian.

## A Standardization Committee Suggested for Car Design

BROOKLYN, N. Y., Oct. 20, 1914.

To the Editors:

With the advent of steel in passenger car construction, the question of standardization in design has become a pertinent one, and the railways as well as carbuilders' engineers keenly feel the need for adopting standards that will simplify construction and reduce to a minimum the labor attached to the preparation of plans, templates, dies, patterns, specifications, etc., in connection with placing of orders for new equipment.

You have suggested recently that the contour of roof, curvature of buffer, spacing of posts, construction of underframe and other similar details are subject to standardization to an extent that the expense of engineering in connection with purchases of new cars would be reduced. While some of the items mentioned could undoubtedly be standardized it will be quite evident to the designer that the mere adoption of certain standard dimensions in the general design would not result in lessening the cost of engineering nor reduce the preliminary shop work in connection with the construction to any marked degree. The variation in general dimensions and contour of the car structure, would hardly be considered a factor in the preliminary cost to the carbuilder, and to the railway engineer standards of the nature referred to might prove a hindrance rather than a help, in designing the best car for a given service.

I am firmly of the opinion that the opportunity for real standardization work in connection with car construction lies, not in the attempt to provide a standard car, but in adopting standard practices in connection

*Bulletin 9 of the University of Illinois Engineering Experiment Station.

with the details of design. The adoption of standard sections for framing members, pressings and drawn steel, riveting, moldings and framing connections together with uniform practice in connection with calculation of stresses, specifications and forms of contract should be of mutual benefit to the railways and carbuilders.

A great deal could be accomplished along these lines by the organization of a standing committee of experienced designing engineers representing both the car builders and railways. This arrangement would afford a means for full and thorough investigation and consideration of the various items entering into car construction applicable to standardization and should result in reducing to a minimum the inconsistent variations in designs due largely to the individual ideas of the designers.

W. E. Johnson.

## Development of Carload Freight on Electric Lines

Detroit United Lines

Detroit, Mich., Oct. 20, 1914.

To the Editors:

During the last few years a great deal of attention has been given to the development of the freight business on electric lines. Not the least interesting feature of this development is the method employed, which appears to vary greatly in different localities and which to some extent may be said to reflect the local conditions. Unfortunately, the freight business, on many of the electric lines, is confined almost entirely to that of moving less than carload quantities. This is so not because the carload business is undesirable but largely because the franchise restrictions and the terminal facilities available in the cities do not permit of the development of so-called carload business on even a moderate scale. However, even under such circumstances it may be possible to secure a small portion of the more desirable carload traffic.

Considerable discussion has been had as to the necessity for meeting steam road rates in competition for this freight business. Some electric lines have adopted the steam road basis of rates throughout, even to the low commodity rates, applying on carload business. The wisdom of such a course is questionable, as the cases where it is necessary to meet the steam road rate in order to secure a fair proportion of the business are exceptions. On the other hand, the steam road rates are so low, in many instances, that it is doubtful if an electric line operating freight cars in single units or with from one to four car trains could live under such rates.

Between growing communities there is always an exchange of commodities in carload quantities on which prompt service is required, and it is this class of business which should appeal to electric lines since it affords an opportunity of securing business at rates which may be made remunerative. There may be several things to incline the shippers to consider the electric lines, such as a shortage of cars and the indifference of steam roads, but service is the strongest argument, and once the business is secured, satisfaction in this respect will invariably overcome any objection to the higher rate.

The electric lines are here to stay. They are a force for much good in the development of the territory through which they pass, and the freight department is contributing its quota. The service afforded over these electric lines should be an important factor in determining a basis of freight rates. As a matter of fact, isn't freight service on electric lines really express service, minus the pickup and delivery features, just as dependable in every respect and in many cases more so? This is something which it is believed the public is rapidly coming to understand and appreciate, and in the end it is bound to redound to the good of the electric lines.

N. Rumney,
Traveling Freight and Express Agent.

## New Committees of the American Association

Several committees were authorized at the last meeting of the executive committee of the American Electric Railway Association held in Atlantic City, and in the case of two of these committees the members have been appointed by President Allen.

One of these committees is that appointed to take charge of the midyear meeting of the association, which is to be held this year during the last week in January in Washington, D. C. The committee in charge of this meeting is Charles L. Henry, chairman, M. C. Brush and J. H. Hanna.

Another committee has been appointed to consider the present rules of the association in regard to individual members, and this committee will report to the executive committee whether in its opinion any changes in these rules are advisable. The members of this committee are L. S. Storrs, chairman, Charles L. Henry, C. S. Mitchell, L. P. Crecelius and James H. McGraw.

The association will also have a committee on valuations. The personnel of this committee has not yet been selected by President Allen, but it has been decided that the committee will be made up of six members consisting of three executive officers of member companies, two consulting engineers and one accountant.

## Engineers Disapprove of Registration

The Pennsylvania Legislature last winter authorized the appointment of a commission, which was duly appointed, to look into the advisability of the registration of engineers. Hearings were held in Pittsburgh on Oct. 15 and 16, and in Philadelphia on Oct. 19. A final hearing is to be held in Harrisburg Oct. 28. The commission prepared a bill, based on that drawn up by members of five national engineering societies, for the purpose of stimulating discussion and obtaining the views of engineers of the State.

At the hearings in Pittsburgh and in Philadelphia the general sentiment was strongly opposed not only to the bill offered but to any licensing bill. Previous to the Philadelphia hearing the Philadelphia Association of Members of the American Society of Civil Engineers discussed the matter and was represented before the commission by a committee, which presented a report giving arguments against any form of registration or licensing. The association, however, suggested some measures which would help to accomplish the primary object sought, that is, the safeguarding of life, health and property. In the committee's opinion this could more certainly be accomplished by requiring State approval of plans for engineering structures than by attempting to weed out by examination incompetent engineers. The commission expects to present a preliminary report to the Governor about Nov. 1, and a final report at the end of this year.

A consular report from Japan states that there are now within a radius of 50 miles of Osaka close on 250 miles of double track in operation and 80 miles more under construction or proposed in the near future. The growth of light railways has been slower, there being at present less than 50 miles, but another 50 miles are under construction. Numerous plans are projected, but hitherto these have been held up by the difficulty of finding capital.

# Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

*(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)*

## Standard-Wheel Low-Step Car with Opera Seats

BY G. T. SMITH, MASTER MECHANIC METROPOLITAN STREET RAILWAY, KANSAS CITY, KANSAS CITY, MO.

A single-end car containing such refinements as a 13½-in. step with 34-in. wheels and opera-chair seats has been put in service recently by the Metropolitan Street Railway, Kansas City, Mo. This equipment was developed in the company's shops from an old car remodeled for experimental purposes. The method of obtaining a low step without reducing the wheel diameter should be of particular interest. The step height from the rail is 13½ in., from the step to platform floor 12½ in. and from the platform floor to the car floor 9 in., making a total height of 35 in. The difference between this 35 in. and the necessary wheel clearances was made up by the combined ramps or incline on the rear platform and car floor. The car floor proper was ramped or inclined 2½ in. from the end sill to the body bolster. The platform floor was ramped 3 in. in the form of a spiral, starting from a point 14 in. inside the entrance door and extending to the end sill of the car.

In order to avoid placing the conductor on the inclined floor, a small platform, or dais 4½ in. high was built in the center of the vestibule beside the step at the bulkhead. This dais is also used as an auxiliary step at the rear exit door. In service, the dais is found to be advantageous, since it elevates the conductor above the passengers' heads and gives him the desired commanding view, as from 75 to 80 per cent of passenger leave the car by the front exit. One of the accompanying illustrations of the rear platform indicates that the spiral ramp is inconspicuous. It will also be noted that the conductor's stand is fitted with an adjustable seat which folds automatically when not in use.

Both the rear exit and entrance doors were hinged and all operating mechanism was placed underneath the platform. The doors are controlled through two operating handles, one above the other, installed at the dividing rail between entrance and exit aisles. The front exit door is of the sliding type and is operated in conjunction with the folding step, the mechanism being arranged so that the step is completely lowered when the door is one-third of the way open. This detail was arranged to prevent a passenger in a hurry from passing out of the door before the step was in position for regular service.

KANSAS CITY CAR—SIDE VIEW OF OPERA SEAT IN LOWERED POSITION

KANSAS CITY CAR—REAR PLATFORM WITH CONDUCTOR'S DAIS AND INCONSPICUOUS SPIRAL RAMP

KANSAS CITY CAR—OPERA SEAT SHOWN IN FOLDED POSITION

Undoubtedly the seats constitute the most novel feature in the design of this car. These are built like opera chairs, there being two hinged seats to one back. The seats are covered with rattan and no springs are used in the upholstering. They are very comfortable and much superior to the upholstered type from a sanitary standpoint. Another feature is that when the car is crowded and the person nearest the wall of car desires to leave, it is unnecessary for the other seated passenger to step out in the aisle because the outside passenger simply rises and folds his seat behind him, thus making sufficient space for the passenger nearest the wall to pass by him.

Still another feature of these seats is that they facilitate car cleaning. During the cleaning the seats may be folded against the back, thus giving the sweepers and cleaners free access to the floor. As shown in one of the accompanying illustrations, the seats are supported with one pedestal placed at the center, the overhang on the aisle being free from the floor to the bottom of seat. The inside end of the seat is attached to the car side by a bracket, which makes a very rigid construction. The electric heaters are of the short cross-seat type, and are placed beneath the seat adjacent to the wall, the seat castings having suitable lugs cast thereon for the attachment of the heaters.

Car illumination is supplied by five 54-watt tungsten lamps with Holophane shades installed along the center line of the body. In view of the difficulties encountered in the drilling of the steel carlines in the roof of an old car, the six-lamp circuit with selector switch was not used. In order to provide some light, should the main lighting circuit fail by the burning out of a lamp, an extra or sixth lamp was installed in the circuit used for the signs and headlights which are supplied with 23-watt tungsten lamps. By the use of a three-way switch a light from the front sign can be diverted to the inside circuit. This, with two 23-watt lamps of the same circuit which light the rear platform, gives sufficient light until the car reaches a terminal.

## Ground Connections for Clusters

BY G. H. MCKELWAY, DISTRIBUTION ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

On roads using wooden trolley poles, whenever it is desired to hang a light cluster to light a station platform or road intersection, it is the custom to run the ground wire down the pole, stapling it to the pole to make a neat looking job and also to prevent or at least discourage the theft of the wire. Then the wire is run underground from the foot of the pole to the nearest track rail, to which it is attached by means of a bond terminal.

But on lines where the overhead work is supported from metal poles it is common to use the pole itself as part of the negative return. Instead of carrying the ground wire down the pole it is customary to connect it to the pole at the height of the cluster bracket or span wire and let the pole carry the current to the ground. Then the pole itself is either considered to be well enough grounded to make unnecessary any connection to the rail, or, if that is not thought to be desirable, a wire is run underground from the base of the pole to the track and grounded there. This latter precaution may seem unnecessary, but the practice of connecting to the rail as well as to the pole is standard with many companies and is rightly considered to be safer and sometimes more economical. The only advantage that the first plan has over the second is the matter of first cost, and generally of maintenance as well.

The greater cost of the second method is not so much the cost of the extra piece of wire as of the labor to open the street and install it. The cost of this opening is generally high because metal poles are seldom used except in cities where the streets are usually paved, and the cost of opening up an asphalt or stone or wood-block pavement laid on a concrete foundation is appreciable and is often increased by the necessity of having to pay an excessive sum to the city inspector who is assigned to see that the opening and repairs are properly made. However, there are three objections to considering sufficient the grounding of the pole alone. Iron poles are nearly always set in concrete, and good concrete is a pretty fair insulator although the concrete placed around the butts of poles is often of a rather poor quality. The three objections are as follows:

Lamps—Full voltage does not get across the lamps owing to the poor ground and, therefore, they do not burn brightly.

Poles—The continual passage of current from the lamps to the pole and from it to the ground causes electrolysis, which gradually destroys the pole at the ground line. This objection may seem to be rather far-fetched, but the writer knows of several instances where such marked deterioration of the pole has occurred just at the ground line that it has been necessary to renew the poles because they were dangerous in their weakened condition. In one case where a common ground wire from several clusters was grounded to a pole, that pole soon failed and was replaced with another with the same ground connection. The result was that the second pole failed within two or three years. Then a ground connection was made to the track and the trouble ceased.

Persons and Animals—It is quite easy, in dry weather, even for the poor concrete in which a pole may be set to become a fair insulator, and sometimes a very good one, with the result that as soon as the cluster is lighted the pole becomes charged and is then a source of danger to any person or animal that might touch it.

A good connection to the nearest track rail does away entirely with the first and third objections and makes the second practically negligible, although with a soil of low resistance a very small proportion of the current may leak to the rail through the ground instead of being carried away by the wire. Please note, however, that the writer says "a good connection." As soon as the wire becomes broken or the terminals loosen from either the pole or the rail the connection drops into the first class and acquires all the objections of that class.

A still better plan, although more costly, is to run the ground wire directly from the cluster to the track, in the same general manner as when wood poles are used, instead of making any connection to the pole. It is of course impossible to staple the wire to an iron pole and, in a city, the necessity for neatness of construction and protection against the theft of the wire is even greater than where wood poles are permitted.

Therefore, the obvious way to install the wire is to run it down the pole in an iron or fiber pipe, the latter being attached to the pole by means of bands around both. The iron pipe is the stronger and is almost always used, although fiber has been substituted on some lines because of the belief that with iron pipe the ground wire would not help as a lightning arrester due to the choking effect of the iron pipe which surrounds it. This precaution seems to be unnecessary, but whatever construction is used the result is the best possible ground because there is a strong permanent connection direct from the cluster to the track.

*The Engineer* of London states that the percentage of unemployment in Great Britain during August, the first month of the war, was 6.3. At the end of September the percentage of unemployed had fallen to 5.1. These figures apply to the insured trades.

# Catenary Experiences on the Empire United Railways, Inc.

BY THOMAS H. MATHER, CHIEF ENGINEER

Catenary construction on the original Syracuse, Lake Shore & Northern Railroad and on the Rochester, Syracuse & Eastern Railroad (these roads being now merged under the name of the Empire United Railways, Inc.) has proved to be a decided improvement over the pole-span construction. On the initial installation from Long Branch to Baldwinsville, some mistakes were made owing to erroneous ideas regarding what the catenary would and would not do.

The construction consisted of Archbold-Brady steel bridges on four concrete pedestals, spaced 300 ft. apart. The messenger was 9/16-in. steel cable. Hangers were 10 ft. apart, excepting on six spans, where the spacing was 20 ft. apart. This difference in spacing was owing to the fact that the second track was extended some 900 ft. farther than originally intended, and as the overhead material was already purchased, a makeshift erection of half the number of rods on these last spans was employed. The only provision made against side sway was a steady strand from the hanger to the side of the bridge; that is, on tangents only once in 300 ft. Anchor bridges were erected at each end of this 7-mile section.

The doubts entertained were: first, that 10-ft. spacing of hanger rods was too infrequent; second, that the bridges were of too light construction; third, that during heavy storms, with wind blowing at or about right angles to the line, the sway of the trolley wire would be so excessive as to interfere with successful operation.

Operation was started before the construction of the overhead was completed, about 2 miles of the line being entirely loose, and not steadied at the towers. The first car went over the line on a day in February, with a gale of wind from the west (the line is approximately

CATENARY CONSTRUCTION EMPIRE UNITED RAILWAYS, SHOWING CONSTRUCTION OF TOWERS

north and south). No sway that interfered with operation was observed. On the 10-ft. spacing there was excessive "chattering," which materially decreased on the 20-ft. spacing and every bridge stood and is standing yet.

Acting on the practical lessons received, every alternate hanger was removed. Later 30-ft. spacing was used, then 50-ft., and later still 60-ft. spacing. This last spacing has proved entirely satisfactory. On this first section, an attempt was made to provide for expansion by leaving a camber of about 12 in. in the trolley wire in the center of the span, so that in warm weather the expansion of the messenger would make the trolley wire straight from tower to tower. The results were not as expected and attempts at such adjustments were not repeated on later construction. It has been found that during the first year after construction both messenger and trolley wire require adjustment, owing to changes of temperature, and thereafter give little trouble.

The cost of this initial section was about $4,580 per

STANDARD CATENARY BRIDGE CONSTRUCTION ON THE EMPIRE UNITED RAILWAYS

mile of double track, including all material, bridges, concrete foundations and all erection, but exclusive of the cost of copper wire. This exceeded the cost of pole-span construction by about $1,200 per mile. This pole-span construction was with poles 35 ft. long, tops 8 in. diameter and butts not less than 14-in. diameter, set about 85 ft. apart, and the cost was $3,279 per mile of double track.

On later construction from Baldwinsville to Fulton some changes were made, such as building a more economical bridge and removal of hanger rods, which effected a slight economy; but on the latest construction, a still further and more decided economy was obtained by using as messengers the two 500,000 circ.-mil feeder cables, which had been carried on cross-arms on the towers. This saved the cost of the steel cable messengers and the cost of erection of the feeders, and reduced the cost of material (excepting copper) and erection complete to $3,517 per mile, or $238 more per mile of double track than pole construction.

The appearance of a railroad with this catenary is greatly improved over that with poles, and insures greater safety in operation of high-speed roads at grade highway crossings, as the open nature of catenary does not obstruct the motorman's view on each side, as do poles.

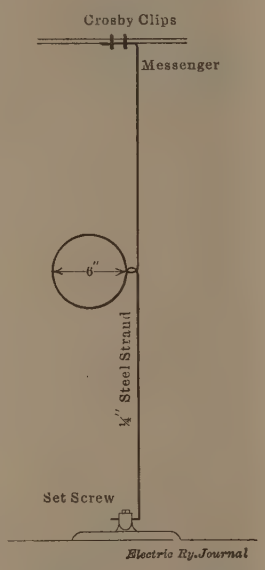
Maintenance costs are somewhat lower than on pole lines, but as the principal cost is the renewal of rods and sister hooks, a hanger device with screw connections eliminated would materially reduce the cost of maintenance. The corrosion of the threads in the rod and sister-hook connection makes renewals necessary in from two to four years. A flexible hanger is recommended, rather than a rigid type, especially on single track, where the impact of the trolley wheel is on both sides of the ear. The tendency in these cases is to bend the trolley wire upward, leaving the ear slightly under the wire and offering an obstruction to smooth travel of the trolley wheel.

An experimental home-made hanger of ¼-in. steel strand has been in use on the Rochester-Syracuse division for about four months and so far has given satisfaction. In its first form a loop was put in the strand about half way between the trolley wire and the messenger, and twisted to a horizontal position. While this gives flexibility under compression yet it has slight resistance to tension. In the later form an additional twist is given leaving the loop vertical and giving greater resistance to any tensile stress without impairing its flexibility. The strand is attached to the messenger by two Crosby clips and to the ear by bending about 2 in. of the strand at right angles and introducing it into a horizontal hole through the boss. It is fastened by a set screw at the top.

The bridges require painting once in five years and the cost is about $2.35 each for paint and labor.

It will be found more satisfactory to build a separate telephone line on the edge of the right-of-way, and the cost of catenary construction hereinbefore given includes this. The telephone line is of 25-ft. poles 6-in. diameter at tops, set forty per mile, with two circuits of No. 10 hard-drawn copper wire.

Hard spots have not developed on any part of the trolley wire, but on single track, portions contiguous to the ears have become slightly annealed.



HOME-MADE HANGER

There is an assertion by linemen and car men that operation on catenary is not so much impeded by sleet as on pole lines. There is no good proof that the catenary line will stand up under more sleet than poles will, and it is possible that sleet may more readily shake loose on the longer spans of catenary. Trolley sleeves of the Ohio Brass Company's Type A or Type C are recommended, as trouble has been experienced with any type surrounding the wire, especially if they are located near the hanger rods.

Pull-off poles on curves are spaced 100 ft. apart and a ¼-in. steel cable messenger is run the entire length of the curve attached to the towers and these poles. Pull-offs are attached to messengers and trolley wire and secured to this cable.

The catenary on this railway has shown a decided superiority over any pole-span construction in appearance, in its permanency and in its maintenance cost. As a large proportion of that cost is due to the type of hanger rod used, the installation of a flexible type secured to the messenger, in some other satisfactory method than by a device involving the use of a screw, will result in a further reduction. Since the difference in initial cost of construction is so insignificant, in a choice, a consideration of that feature would be negligible. While this particular type of catenary was erected as a pioneer effort, those responsible for its adoption feel that their decision has been justified by the results. On the road employing this type of catenary, no pantograph operation is used, all cars being equipped with trolley pole and wheel, and attaining a speed of 60 to 65 m.p.h.

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The Georgia Railway & Power Company, Atlanta, Ga., has distributed twenty-three pulmotors intended for free use of the public in emergencies along its 600 miles of line in Georgia.

## Wheel Gages Used at Decatur Shops

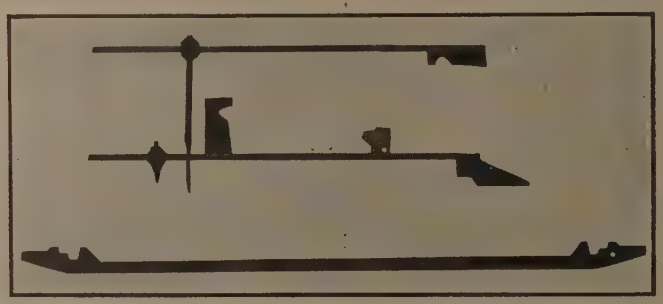
BY J. C. HOUGHTON, MECHANICAL DEPARTMENT ILLINOIS TRACTION SYSTEM

At the main shops of the Illinois Traction System at Decatur, Ill., we have built and used for some time with accurate results the wheel gages shown in the accompanying halftone. These gages are lettered *A*, *B* and *C*. They are designed for use with M.C.B. standard wheels. The material of which they are made consists of ⅝-in. cold-rolled steel and 3/16-in sheet steel. The scribers are ⅜-in. Stubbs steel.

In mounting a new wheel and axle, gage *A* is first used for finding the center of the axle. The heel of the gage is set up against the fillet of the journal and a mark is made at the approximate center, using the scriber. The same operation is then performed from the other end of the axle and another mark is made with the same setting, and then the proper adjustment is made to determine the center. The scriber is adjustable and can be used on various sizes and lengths of axles, and yet it is so securely mounted that very accurate work can be accomplished with it.

After the center of the axle has been determined as just described, gage *B* is used while the first wheel is being mounted. The heel of this gage is a contour of the M.C.B. steel wheel tread. The use of the gage is a very important step in mounting wheels. After the first wheel is in place, it is a very easy matter to determine the position of the second wheel by the use of the width gage *C*.

Our method of using gage *B* is as follows: Press the first wheel on a few inches. Then put the contour over the wheel and level up the bar with a level using the adjustable scriber which moves up and down in the hollow stem, according to the different sizes of wheels. After the bar is level and the scriber rests on the axle, it is locked in this position and the wheel is then pressed on until the scriber comes to the center line made by gage *A*. The scriber does not slide back and forth on the bar as it does on gage *A*. It must be secured after once set for the gage of track for which it is used. Gages *A* and *B* can be used for narrow-gage work.


ILLINOIS TRACTION SHOPS WHEEL GAGES

By the use of gage *C*, which is made of flat steel and cut out at the end in accordance with the M.C.B. requirements, it is easily possible to get an accurate setting for the second wheel.

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It is reported in Australia that the war will not appreciably retard the carrying out of the Melbourne suburban railway electrification scheme; only some $30,000 of material is of German origin, and it can be obtained elsewhere. In connection with the Sydney railway station lighting and signaling projects, a portion of the work has already been carried out, but owing to the difficulties in obtaining supplies of apparatus from Europe, the completion of this work is uncertain.

## Building a Way Station for $263

The following data cover the constructional features, bill of material and costs of a standard 8 ft. x 10 ft. way station as built by the Northern Ohio Traction & Light Company:

The platform consists of a cinder foundation upon which rest 6 in. of concrete, the upper 1 in. being a wearing surface. The body of the slab is 1:2:4 mixture, and the wearing surface one part cement and two parts sand. The platform is cut into sections, as shown on the plans, this cutting extending through to the foundation. The surface is finished rough.

As anchor bolts ⅝ in. x 12 in. machine bolts with washers are used. These are carefully placed, using a wooden template made to accord with the drawing.

The framing is entirely of dressed lumber. The wall framing, with the exception of the doorway and window openings, is completely covered with No. 27 gage "Trussit," fastened on with staples. The "Trussit" is then plastered, first on the outside, with a mixture of one part Portland cement and three parts sand, tempered with lime mortar, if necessary. This plastering is ⅜ in. thick outside of the metal and floated to an even surface. When the outside is set the inside is plastered in the same manner.

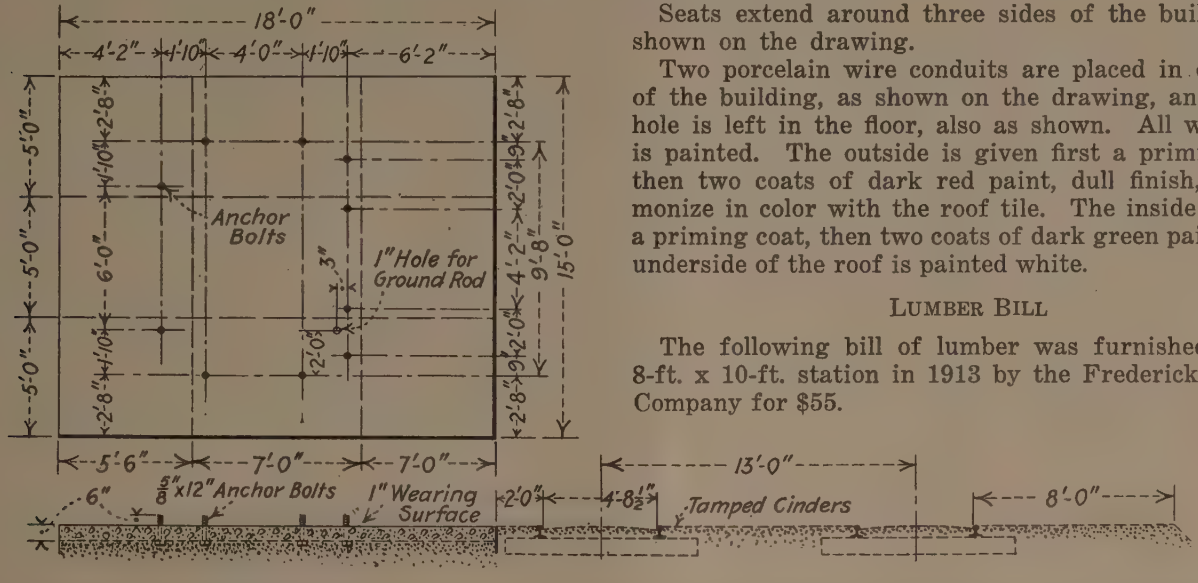
The rafters are curved, as shown on the drawing. On these is laid 1-in. x 6-in. match flooring, which in turn is covered with four-ply roofing felt to form a bedding for the tile. The tile is 7-in. x 10-in. vitrified red Spanish roofing tile, carefully laid. The door casing, window frames and outside corners are put on after the plastering is done and set.

Seats extend around three sides of the building, as shown on the drawing.

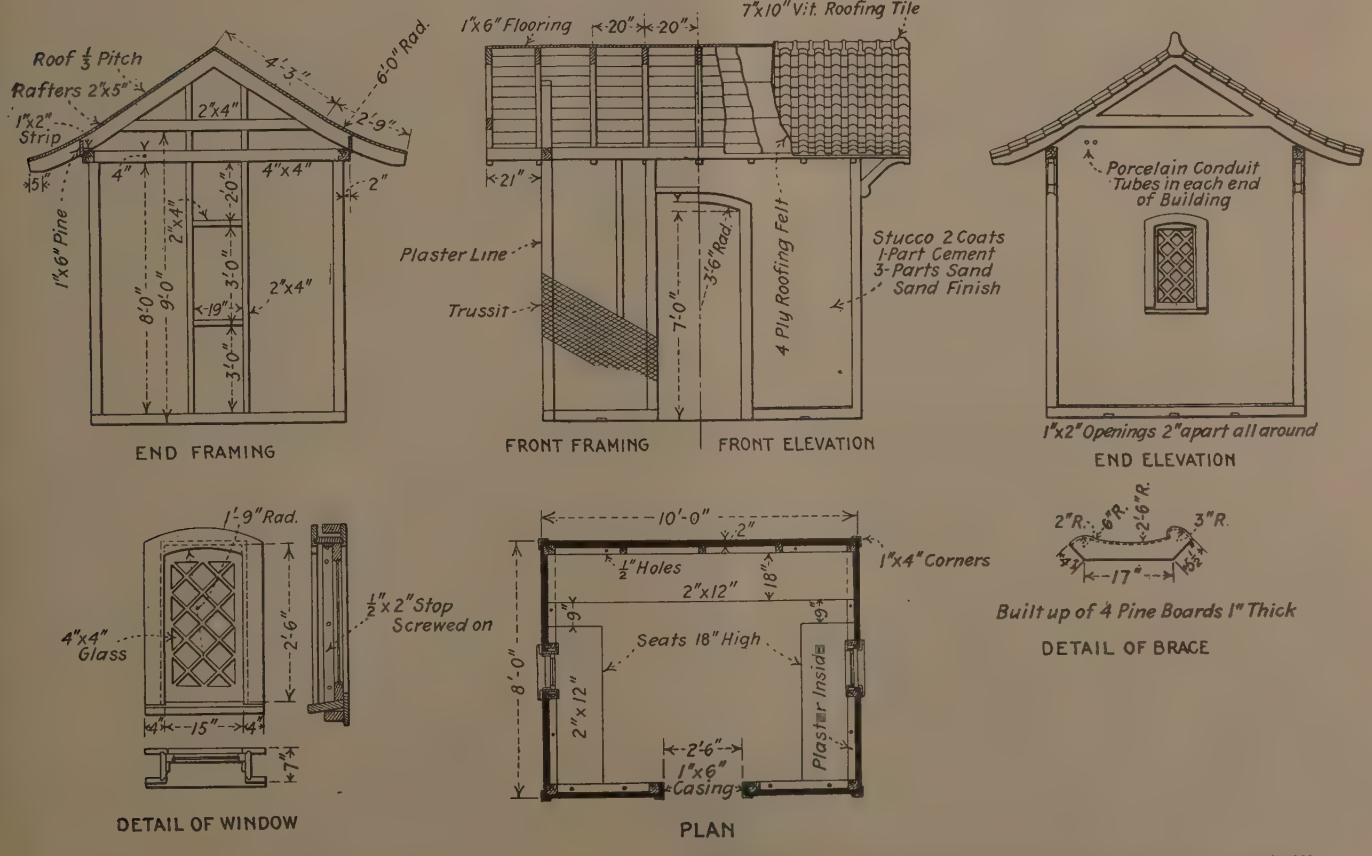
Two porcelain wire conduits are placed in each end of the building, as shown on the drawing, and a 1-in. hole is left in the floor, also as shown. All woodwork is painted. The outside is given first a priming coat, then two coats of dark red paint, dull finish, to harmonize in color with the roof tile. The inside is given a priming coat, then two coats of dark green paint. The underside of the roof is painted white.

### LUMBER BILL

The following bill of lumber was furnished for an 8-ft. x 10-ft. station in 1913 by the Frederick Lumber Company for $55.




PLATFORM FOR STANDARD 8-FT. X 10-FT. WAY STATION OF NORTHERN OHIO TRACTION & LIGHT COMPANY




PLAN AND ELEVATION OF 8-FT. X 10-FT. WAY STATION FOR NORTHERN OHIO TRACTION & LIGHT COMPANY

2 pieces, 4 in. x 4 in., 14 ft.....Pine S 4S
2 pieces, 4 in. x 4 in., 12 ft.....Pine S 4S
10 pieces, 4 in. x 4 in., 10 ft.....Pine S 4S } Frame
3 pieces, 2 in. x 4 in., 10 ft.....Pine S 4S
3 pieces, 2 in. x 4 in., 10 ft.....Pine S 4S
18 pieces, 2 in. x 8 in., 7 ft.....Pine S 4S } Rafters (sawed at mill)
250 ft., b. m., 1 in. x 6 in.....Match flooring, pine

3 pieces, 2 in. x 12 in., 10 ft.....Pine S 4S Seats
8 pieces, 1 in. x 6 in., 12 ft.....Pine S 4S Casings, etc.
2 pieces, 1 in. x 8 in., 12 ft.....Pine S 4S End finish
2 pieces, 1 in. x 8 in., 12 ft.....Pine S 4S Corners
2 pieces, 1 in. x 2 in., 12 ft.....Pine S 4S Strips

2 window frames, 2 sashes, 4 fancy braces—Mill work.
250 sq. ft. 2-ply felt roofing.

### OTHER MATERIAL

Platform

| | |
|---|---|
| 4.17 cu. yd. 1:2:4 concrete | 0.83 cu. yd. 1:2 mortar |
| 6 2/3 bbl. cement | 2.66 bbl. cement |
| 1.9 cu. yd. sand | 0.75 cu. yd. sand |
| 3¾ cu. yd. stone | 10, ⅝-in. x 12-in. machine bolts |

Roof

2½ squares red Spanish roofing tile 7 in. x 10 in.
14 ft. cresting, Spanish roofing tile.
28 ft. eave tile, Spanish roofing tile.
2 pinials, Spanish roofing tile.

Walls

40 sheets, 15½ in. x 96 in., No. 27 gage "Trussit."
281.39 sq. ft. plastering, 1in. thick, 0.89 cu. yd.
2.1 bbl. cement.
0.89 cu. yd. sand.
1.5 sacks lime for tempering.

Wiring

2 porcelain conduits.

Painting

Done by contract.

### COST OF ONE STATION

The cost of all items for the standard 8-ft. x 10-ft. way station totals as follows:

| | |
|---|---|
| Lumber, complete with door, window frame and sashes | $ 55.00 |
| "Trussit," 428 lb., at 4 cents (less discount) | 16.84 |
| Roofing tile (cost includes freight) | 41.25 |
| 11.43 bbl. cement, at $1.28 | 14.65 |
| 3.54 cu. yd. sand, at $0.60 ton | 2.58 |
| 3.75 cu. yd. stone, at $0.95 ton | 4.75 |
| 1.5 sacks lime, at $0.50 sack | .75 |
| Labor of erecting | 115.07 |
| Painting | 12.00 |
| Total cost of building | $262.89 |

## Oil as a Cause of Commutator Pitting

In a paper read before the Association of Iron & Steel Electrical Engineers B. G. Lamme stated that the phenomenon of pitting or the eating away of the mica between commutator bars had often been falsely credited to commutating conditions, to high voltage between bars, too thin mica, quality of carbon brush, use of lubricants, etc.

Some years ago an extended study of this matter had been made. This was based upon a large number of cases of actual trouble. The results from machines in actual service were so conflicting that no positive conclusions could be drawn. However, eventually the evidence pointed to oil as one of the fundamental conditions in this trouble. Extended tests were then made to determine the effects of oil on the mica, and the results indicated clearly that those insulations which absorb oil were liable to pit or eat away in time. Apparently where the oil could dissolve out the binding material in the mica, minute particles of carbon or copper would be disseminated through the mica, thus decreasing its resistance locally. Combustion of these particles would usually be noticed as "ring-fire" around the commutator. Ring-fire is almost always due to incandescent carbon particles scraped off the brushes, but is not usually harmful if the mica adjacent to the spark does not burn or deteriorate. Experience shows that the ordinary good grades of mica plate are not affected by such ring-fire, and it is only when foreign conducting particles penetrate into the plate that this burning may gradually eat away the mica. It was found that some binding materials used in building mica plate were more soluble in oil than others, and it was noted that in those plates with soluble binders the pitting was most pronounced. This led then to one solution of the pitting trouble, namely, the use of what might be designated as insoluble binders in the mica plate, with very tight construction of the commutator, so that oil could not penetrate along the sides of the plate, and with care in preventing oil from getting on the commutator.

## Seattle Open Cars Changed to Closed Prepayment Type

For many years past the standard cable car used on the Seattle division of the Puget Sound Traction, Light & Power Company has been of the California type, similar to car No. 61, as shown in the accompanying

SEATTLE CABLE CAR BEFORE REBUILDING

cut. This car, with its open ends and running board, has been the cause of an abnormal number of boarding and alighting accidents. This trouble is aggravated by the fact that the cable lines operate at an approximate speed of 10 m.p.h., which is a further invitation for persons to board or leave the car while in motion.

In March, 1913, a trial car, redesigned so that the entrance and egress of passengers would be controlled by the gripman or conductor, was put in service and was operated with marked success. During the past year eleven additional cars have been converted into the inclosed type, as shown in the cut of car No. 4. It was originally estimated that, if 50 per cent of the step accidents on the cable lines could be eliminated, the

SEATTLE CABLE CAR AFTER REBUILDING

interest on changing these cars from the old type to the inclosed type would be about 20 per cent. It has worked out in practice that approximately 75 per cent of the step accidents have been eliminated with the inclosed type of car. The interest on the investment made in converting these cars is therefore about 30 per cent.

A further saving from the operation of these cars is due to the fact that at the present time all passengers enter at one point, depositing their money in fare boxes.

The inclosed type of car weighs, without passengers, approximately 14,700 lb. This is practically the weight of the car before it was redesigned. The width is 8 ft. 8 in. over all. The car seats thirty passengers. These cars are equipped with Exide batteries, 5-watt 8-volt lamps, and have nine lights. The center portion is entirely inclosed, both ends being open with two sliding doors on each side. The step folds with the sliding door.

## Dynamiting Concrete Track Foundation

For several years the United Railways Company of St. Louis, Mo., has resorted to dynamite as the most economical means of loosening the concrete foundations under its track when rehabilitation is necessary. The method adopted has been to blast with small charges of dynamite which were sufficient to shatter the concrete so that it could be taken out in large pieces, and at the same time not damage the surrounding property. Essentially the equipment used in this work consisted of a car equipped with motor-driven air compressor for use in driving the drills and a cover car to confine the blasts.

ST. LOUIS DYNAMITING CARS—VIEW OF COVER CAR DURING BLAST

ST. LOUIS DYNAMITING CARS—DRILL GANG AND AIR COMPRESSOR CAR

After holes have been drilled in the concrete, slightly below the center of gravity of the section to be removed, a 0.1-lb. charge of 40 per cent dynamite has been rammed into it. A fulminating cap has been used to explode this charge, twelve holes being shot at one time by an electric firing machine. In order to prevent damage by flying rocks or broken concrete at the time of the explosion, each blasting gang has been supplied with a cover car, which is merely a flat car with a heavy bottom and side boards extending below the car floor. This equipment has proved very effective in service and has not been superseded since it was adopted in 1906. Views of the cover car, the air compressor car and 1¼-in. drills, as well as the cover car during an explosion, are shown in the accompanying illustrations.

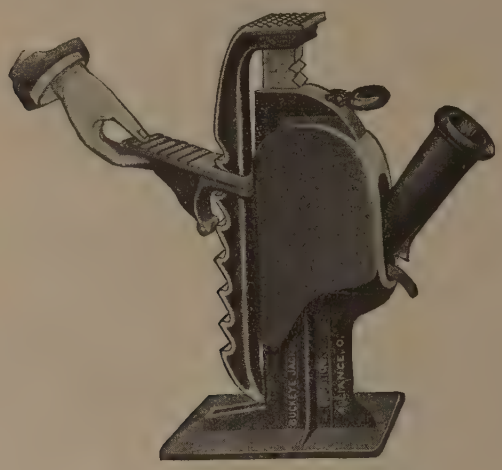
## Ingenious Fusible Plug

A correspondent of *Power* describes an ingenious fusible plug which is reported to have overcome the difficulties experienced with the usual type set directly in the boiler shell. The new form is set at the top of a piece of ½-in. pipe several feet long screwed through the shell and extending below the lowest normal water level of the boiler. The fusible plug is composed of an alloy that melts at the temperature of the steam, or, say, 350 deg., but, since the lower end of the pipe is below water level, no steam can reach the plug unless the water is low. Normally the radiation from the pipe cools the water that is in it considerably below steam temperature and keeps the plug from melting.

ST. LOUIS DYNAMITE CARS—VIEW OF COVER CAR USED TO CONFINE EFFECTS OF BLAST

## Jack with Adjustable Auxiliary Foot

The Buckeye Jack Manufacturing Company, Alliance, Ohio, has recently added to its extensive series of jacks a design of 5-ton capacity designated the No. 14 Special. A feature of this jack, and one said to be original with its manufacturer, is the adjustable auxiliary foot. This



JACK WITH ADJUSTABLE FOOT

adjustability is secured without the use of tools so that changes for operation at almost any height can be made very quickly. The height when the bar is down is 14¼ in., the raise is 7½ in., and the height when the bar is up is 20½ in. The jack is made of malleable iron. It weighs about 40 lb., and is made both single and double acting.

## Safe Deposit Fare Box

For the past several years the Ohmer Fare Register Company, Dayton, Ohio, has been exploiting an unusual type of fare box known as Ohmer's "Safe Deposit." This box contains a steel tube, which, when removed, automatically seals the deposits placed therein.

FARE BOX APPLIED TO PAY-WITHIN PREPAYMENT CAR

The merits of this box may be summarized as follows: Its size economizes platform space; it permits tickets in strips to be deposited; it has no exposed screws or bolts; the cylindrical insert is easily handled and practically indestructible and the insert locks automatically when withdrawn from the box; the lower half of the box is made of steel and the upper part is cylindrical plate glass; ingeniously placed baffle plates make it difficult to extract coins from the box; the box can be placed anywhere on a platform without interfering with traffic and it can be maintained at slight expense.

The dimensions of the fare box are as follows: length of outside tube, 15⅞ in.; length of insert tube, 12¾ in.; length of glass, 10⅞ in.; outside diameter of tube, 5 in.; outside diameter of insert tube, 4¾ in., and length of fare box with hopper, 30¼ in. The weight with insert tube is approximately 20 lb.

## Side-Entrance Trailers for Chattanooga

Growing appreciation of the merits of the side-entrance car for trailer service is shown again by the purchase of two such cars by the Chattanooga (Tenn.) Traction Company from The J. G. Brill Company. These cars, which seat fifty passengers on end and

CHATTANOOGA SIDE-ENTRANCE CAR—EXTERIOR, WITH DOORS CLOSED AND STEP FOLDED UP

transverse rattan seats, are 38 ft. 3¾ in. over the vestibules, 30 ft. 2¾ in. over the car posts, 8 ft. 4 in. over the sills and 8 ft. 6⅞ in. over the base of the arch roof. The height from the top of the rail to the sills is 2 ft. 9½ in. The underframe of the car is composed of metal and the body of wood with interior finish of cherry and bronze trimmings. The body weighs 15,315 lb. and is mounted upon 53-D trucks with Carnegie steel wheels and high-test heat-treated steel. Miscellaneous fittings include eight Brill exhaust ventilators per car, Tomlinson couplers and Hedley anti-climbers. A 12-in.

CHATTANOOGA SIDE-ENTRANCE CAR—INTERIOR VIEW

horizontal wheel brake is provided at the conductor's stand. The cars have swinging glass doors, folding steps, push-button system and International R-5 registers for fare recording.

# News of Electric Railways

## NEW HAVEN DISSOLUTION DECREE

### A Summary Is Presented of the Terms Under Which the New Haven Railroad Will Divest Itself of Its Principal Subsidiaries

The decree embodying the agreement reached by the New York, New Haven & Hartford Railroad and the government for the settlement of the Sherman law dissolution suit begun by the United States against the company was signed on Oct. 17 by Judge Mayer in the Federal District Court at New York and was immediately filed. As a result of this settlement the New Haven Railroad is left in possession of all its railroad lines except the Boston & Maine and its traffic agreement with the Boston & Albany, but it has been compelled to divest itself of all its electric railways except the New York, Westchester & Boston Railway. As regards its steamship lines it loses all except the Sound liners and must abide by the decision of the Interstate Commerce Commission concerning these. Until that decision is handed down it cannot dispose of any of the vessels or real property of the companies concerned, and cannot discontinue operation of the steamship lines or change any existing routing or traffic arrangements. On the other hand, the government is prevented by the decree from again bringing action against the New Haven Railroad upon any of the issues presented in the suit.

In order to accomplish the separation of the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad and of the New York, New Haven & Hartford Railroad and the electric railway and steamship companies, the appointment of three sets of trustees is made, one for the New Haven interest in the Boston & Maine, one for the Connecticut trolleys, and one for the Rhode Island trolleys. These trustees are instructed to sell the stock held by the New Haven system before certain dates set by the court, and to assist any bona fide effort to reorganize the properties. They are forbidden to countenance any attempt on the part of the New York, New Haven & Hartford Railroad or its interests to re-establish by indirect methods its old monopoly. Moreover, to make this more difficult, every purchaser of the stock to be placed on the market is required to execute an affidavit attesting that he is a bona fide purchaser and is not acting in the interest of the New Haven Railroad.

In the first place, the decree declares that the New York, New Haven & Hartford Railroad, the New England Navigation Company, the Boston Holding Company and the Providence & Danielson Railway have been parties to combinations in restraint of trade and are now monopolizing a part of such trade, consisting of transportation by railroad, electric railway and steamboat lines in New England.

As regards the Connecticut Company the trustees to deal with the 400,000 shares of stock of that company, which controls the electric railways in Connecticut, now in the hands of the New England Navigation Company, are Walter C. Noyes, Old Lyme; Lyman B. Brainerd, Hartford; Charles Cheney, South Manchester; George E. Hill, Bridgeport, and William W. Hyde, Hartford. In this case the trustees are to try to have the sale completed by July 1, 1919.

The trustees to deal with the Rhode Island electric railways are Rathbone Gardner, John O. Ames, John P. Farnsworth, Theodore Francis Green, and Charles C. Mumford, all of Providence. The New Haven is to assign to them 96,855 shares of the Rhode Island Company, and the New England Navigation Company is to assign 9132 shares and $600,000 of bonds of the Providence & Danielson Railway, and 7000 shares and $600,000 bonds of the Sea View Railroad. These, as in the case of the Connecticut Company, are to be sold at the request or consent of the New Haven; but if they are not so disposed of by July 1, 1919, a public auction will be held of the remainder under the order of the court. The full proceeds of the sales of the bonds of the Providence & Danielson Railway and of the Sea View Railroad are to go to the New England Navigation Company, and the proceeds of the sale of the stock of their companies and of the Rhode Island Company to the New Haven. The same liberty of exchanging any of these Rhode Island securities for others in connection with a reorganization scheme is given to these trustees as was provided for in connection with the Boston & Maine and the Connecticut trustees.

Concerning all these three sets of trustees the court takes notice that they will have expenses without having funds, so the court orders the New Haven to advance the money needed. The Holding Company trustees are limited to $15,000 a year, but no limitation is put upon the Connecticut or Rhode Island trustees.

It is also ordered that the trustees shall issue to the New York, New Haven & Hartford Railroad and to the New England Navigation Company negotiable certificates of their interests in the properties held by them, and regulations are laid down concerning the action and the responsibility of the trustees. Of these the most important is:

"Each body of trustees in electing directors of any company, which it controls, and in all other actions shall exercise all the powers herein vested in such body so as to assure a management solely in the interest of such company without regard to the interest of the New Haven Company or any other corporation or person, but with due regard to the public interest. If deemed desirable by such body it may cause its own members or any of them to be elected directors of any company."

Then the court orders the sale of a number of blocks of securities held by the New York, New Haven & Hartford Railroad or its subsidiaries, which have given it the control of important transportation facilities. Thus it orders the sale before July 1, 1919, of the New Haven's 53,981 shares of the Berkshire Street Railway. This sale, however, must not be held until the commonwealth of Massachusetts has authorized it, or the Federal Court has issued a further order concerning it at a hearing at which Massachusetts has been invited to be present. The New York, New Haven & Hartford Railroad is also ordered to sell before July 1, 1919, its 5000 shares and $678,000 of bonds of the New York & Stamford Railway and its rights to the stock of the Westchester Street Railroad, when issued, and the New England Navigation Company must sell before July 1, 1919, its rights to the capital stock of the Shore Line Electric Railroad, when issued, and the $13,709,000 of gold notes of the New England Investment & Security Company, which it now owns. None of these shares or other securities shall be sold to anyone in the interest of the New Haven.

Costs are to be paid by the New Haven, the New England Navigation Company, the Boston Holding Company, and the Providence & Danielson Railway.

At the recent directors' meeting of the New York, New Haven & Hartford Railroad William Skinner, a director since 1902, and Morton F. Plant tendered their resignations, which were accepted. As the annual meeting of stockholders will occur Oct. 28 no steps were taken to fill the vacancies.

## RESOLUTIONS HONORING CAPTAIN McCULLOCH

The directors of the United Railways, St. Louis, Mo., have passed unanimously resolutions in part as follows, lamenting the death of Capt. Robert McCulloch, late president and general manager of the company:

"We have found it difficult to prepare a proper memorial of Robert McCulloch. He had that rare faculty which won the love of men, and we cannot think upon his death without distressing emotion. The spell of the living man is still upon us. We remember, too vividly, his many and varied excellencies, his bluff, hearty sincerity, his kindliness, generosity, charm, firmness and high integrity, to be mindful of the lesser qualities which made him useful to the corporation. Fortunately, its record contains the history of his achievements. Called to the management of its affairs at an alarming crisis, he extricated it from embarrassment and restored it to public favor. He won not only the respect but the affection of its employees. By his personal influence he prevailed over all factious opposition and quieted discontent. All men trusted him; his word was

never broken. He was zealous to promote the general welfare and tried constantly to provide a service which should disarm hostility. He listened to grievances, and when he promised to redress them men were content to wait upon his effort. Year by year the corporation has grown in public favor. Yet he was never neglectful of its welfare. His vigilance was incessant. He worked long, without rest, striving continually to perfect its system and enable it to realize a fair return upon the investment. No one knew better than he that the corporation's welfare depended upon the excellence and economy of its service. By his labor he created a great system worthy of a great city, and none now wish to withhold from him the credit which is due to his performance."

Regarding Richard McCulloch, who has been appointed general manager to succeed Captain McCulloch, the St. Louis *Republic* said editorially:

"St. Louis has long known and esteemed Richard McCulloch for his own sake. He is an engineer of note and a man among men. But his advancement to the position of general manager of the United Railways will be especially pleasing to the community because it continues the McCulloch succession.

"For many years the man who wanted to see the president and general manager of the United Railways went to the offices of the company at Park and Vandeventer Avenues and climbed the stairs to the second floor. A door stood open at the end of the hall and just inside it a gray-haired man sat at a long table. This was Capt. Robert McCulloch, and the formalities of obtaining an interview with him consisted of stepping inside the door and stating one's business. Here he met all sorts and conditions of human beings, from the traction magnate to the wife of the discharged employee who had come to plead for "just one more chance" for Tom or Bill. Here he sympathized with the unfortunate, helped the worthy man by giving him a chance to help himself, treated with a tact peculiar to himself the fussy and the unreasonable and entered with energy into every plan for a better, happier or wiser St. Louis in which it was possible for the United Railways to help.

"It is announced in the press that Richard McCulloch will continue to occupy his customary quarters at the offices of the United Railways. This is very much his own affair; but if the son who succeeds his father as executive head of our great system of surface transportation should, at his convenience, see fit to take that same place at the long table opposite the open door, those of us whose philosophy has still room in it for that outdated institution, the family, would be glad of it.

"The *Republic* extends its felicitation and best wishes to the new general manager. And it is unaffectedly glad that the McCulloch succession is to be continued."

## HEARING ON BOSTON TRANSPORTATION IMPROVEMENTS

The Massachusetts Public Service Commission opened hearings on Oct. 20 upon a resolve of the last Legislature providing for an investigation of transportation conditions in Greater Boston and a subsequent report as to recommended improvements. The investigation is the direct outcome of the proposition of P. F. Sullivan, president of the Bay State Street Railway, last spring that legislation be enacted consolidating the Bay State company and the Boston Elevated Railway, with the object of establishing a single comprehensive transit system in the metropolitan district. All the principal steam and electric railways operating in Boston and vicinity were represented at the hearing, which was devoted mainly to an outline of desirable changes presented by W. C. Ewing, of the Boston City Planning Board. At a later hearing the companies will be given the opportunity to present any suggestions and facts which they deem pertinent.

Chairman McLeod said that the commission had lately acquired much data relative to urban transportation conditions through the visit of the chairman and Commissioner Stone to Madison, Wis., Chicago, Buffalo, Cleveland, Toronto and Indianapolis. The engineers and accountants of the commission have been investigating the accounts and relations of the Bay State Street Railway and the Boston Elevated Railway. For the planning board, Mr. Ewing pointed out that the problem of metropolitan transit is a terminal question. Within the area bounded by Broadway extension, Pleasant and Charles Streets and the harbor front, are twenty-seven subway, tunnel and elevated railway stations, and when the Dorchester tunnel is in operation, it will be possible to deliver every street railway passenger within a four-minute walk of his destination inside the business district. There are only three steam railway stations in the above area and one of these is approached by a ferry. The speaker said that the planning board favored state ownership of the transportation system. Representatives from the city of Malden urged the construction of a subway to that suburb, the electrification of various lines of the Boston & Maine Railroad, and an arrangement for the use of the Saugus branch of the latter by the Boston Elevated Railway. Residents of Watertown advocated the placing of the municipality within the 5-cent fare limit and the Roxbury board of trade urged relief from congestion at the Dudley Street elevated terminal.

## CLEVELAND RAILWAY STOCK INCREASE AND TRAINMEN'S ARBITRATION

The Cleveland (Ohio) Railway was notified on Oct. 17 that its application for authority to issue $2,382,600 additional stock had been granted by the Public Utilities Commission.

The company has selected Attorney Charles Higley to represent it in the arbitration proceedings with the platform men. As already announced, Judge Willis Vickery will represent the men, but so far the two have not been able to agree on the third member.

Councilman Mayers has revived the measure to require street cars to stop on the near side of all street intersections. Peter Witt, street railway commissioner, is opposed to the plan, while Director of Public Safety Benesch favors it because he feels that it will enable the department to inaugurate the safety zone system in all parts of the city.

Many councilmen are opposing the proposed crosstown line on East 123d and East 125th streets, between Superior and St. Clair Avenues. They say the line will accomplish no other purposes than to increase the value of certain lands real estate men hold along the proposed line. A real estate firm is now building the streets that are to be used for the line, and expects to have them finished in the spring of 1915. According to Mr. Witt, the cost of the proposed line will be about $75,000.

Mr. Witt has made a new proposition to East Cleveland to prevent that municipality from resorting to its contract which requires through service to West Ninth Street, instead of the Public Square, where cars are looped at present. He has agreed to put on a four-minute service to the Windermere carhouse, with a three-minute service during rush hours, as well as to add fifteen runs between East Ninth Street and the East Cleveland Y, which is the eastern boundary line of the town. The proposal was recommended by E. A. Binyon, city solicitor of East Cleveland.

## ALLEN & PECK, INC., TO MANAGE BUFFALO, LOCKPORT & ROCHESTER RAILWAY

C. D. Beebe, president of the Buffalo, Lockport & Rochester Railway, has announced that the company had accepted the resignation of H. C. Prather as general manager, and had made an arrangement with Allen & Peck, Inc., to take over the operation and management of the property, reporting to the president and the executive committee. Under the arrangement, C. Loomis Allen will become the active member of the firm of Allen & Peck on the property. He will be elected as vice-president of the company, in charge of operation. James P. Barnes, general manager of the Syracuse & Suburban Railway, will become resident general manager of the Lockport road, with headquarters probably in Rochester.

Mr. Beebe and the other officers and members of the board of directors regard the arrangement as one that probably will be of much advantage to the company, as through it they secure the services of men of high character and ability to take charge of the active operation and management of the road. Within the last few months the company has commenced the operation of its cars between Rochester and Buffalo. It also has recently closed a contract with Wells

Fargo Express whereby it will operate a through express service between Rochester and Buffalo, as well as inaugurating a package freight business of its own. The company, in connection with the Empire United Railways, has also made a contract with the Erie Railroad whereby after Nov. 1 it will use the new Erie freight station as a terminal for Rochester business. The company is now using the Erie passenger station for passenger traffic.

Mr. Prather has been with the Buffalo, Lockport & Rochester Railway ever since it began operations. Up until ten months ago, when he became general manager, he held the position of master mechanic and was in charge of the maintenance of rolling stock and other interests. He has been appointed local manager of the Rochester Division of the Empire United Railways.

For the present, the position of general manager of the Syracuse & Suburban Railroad, made vacant by the transfer of Mr. Barnes to the Lockport line, will not be filled. Edward F. Peck, president of Allen & Peck, Inc., will assume temporary charge of the road.

## MR. HEWITT APPOINTED GENERAL MANAGER UNITED TRACTION COMPANY

On Oct. 1 C. F. Hewitt, who has been assistant general manager of the United Traction Company, Albany, N. Y., assumed the duties of general manager, succeeding James F. Hamilton, who will devote all of his time in future to the Schenectady Railway, which he has managed jointly with the United Traction Company. Mr. Hamilton, for a long time, has been desirous of lessening his duties and responsibilities and consented to continue his work with the United Traction Company until Mr. Hewitt had become familiar with local conditions in Albany.

Mr. Hewitt was formerly vice-president and general manager of the Des Moines (Ia.) City Railway and Inter-Urban Railway. He entered the electric transportation field in 1895 as superintendent of the Elmira Water, Light & Railroad Company. In 1900 he went to Indiana as general manager of the St. Joseph & Elkhart Power Company and the Elkhart Electric Company, being principally interested in the management of the latter company in a hydroelectric development of the former company. Upon the completion of this work Mr. Hewitt became operating manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., remaining there until 1908, at which time he was transferred by the owners of the St. Joseph property to the operating management of the railway, lighting and other public utility properties of the East St. Louis & Suburban Company at East St. Louis, Ill. In July, 1912, Mr. Hewitt entered upon his duties with the Des Moines company as already outlined.

Mr. Hamilton entered the transportation department of the International Railway, Buffalo, N. Y., in 1896, and after serving in various positions was placed in charge of one of the largest stations. He resigned his position with that company in 1902 to become assistant superintendent of the Schenectady Railway, and was appointed superintendent of that company in 1909. Two years later Mr. Hamilton was engaged as general superintendent of the United Traction Company, and was retained by the Schenectady Railway in an advisory capacity. In 1912 he was appointed general manager of both companies.

**New Line Opened in California.**—The first section on the Sacramento Valley Electric Railway, Willows, Cal., which extends from Dixon and connects with the Oakland, Antioch & Eastern Railway, has recently been placed in regular operation.

**Short Strike in East Liverpool.**—Fifty union firemen, boiler tenders and ash haulers of the East Liverpool Traction & Light Company, East Liverpool, Ohio, struck on the morning of Oct. 6 because the company refused to reinstate eleven men who had been discharged. The places of the strikers were filled at once and little inconvenience was caused.

**Sliding Wage Scale Rejected in Albany.**—The employees of the United Traction Company who are members of the unions in Albany and Troy, N. Y., have by vote rejected the proposal of the company to put into effect the sliding scale of wages on these divisions. In June the men asked for a flat rate of 35 cents an hour, an increase of 8 cents an hour over the wages paid previously. It is expected that the point in dispute will now be submitted to a board of arbitration.

**Public Utility Commission Decisions.**—The Public Utility Commission Reports Company, Stock Exchange Building, Chicago, Ill., proposes to undertake the work of publishing the reports of the public service commissions arranged exclusively for the use of public utilities. All decisions affecting steam railroads will be eliminated unless they have a bearing upon pubic utilities. The decisions will be segregated into classes and indexed so as to be available for ready reference.

**Service Conference in Pittsburgh.**—At a recent conference between the members of the City Council, Mayor Armstrong and the city solicitor of Pittsburgh, Pa., the answer of the Pittsburgh Railways to the bill of complaint was discussed, and the Mayor was authorized to arrange a conference with officials of the company. The letter of J. D. Callery, president of the company, reviewing street railway conditions in the city was published in abstract in the ELECTRIC RAILWAY JOURNAL of Oct. 17, page 936.

**Short Strike in Fort Smith.**—The trainmen of the Fort Smith Light & Traction Company, Fort Smith, Ark., have returned to work following an agreement reached with the officers of the company. The strike continued for a period of twenty-four hours. Under the terms of the settlement the fifteen employees who were discharged recently will be reinstated, the seniority rule will be put in force, and in future all disputes will be referred to arbitration if the grievance committee which is appointed by the men cannot reach an agreement with the officers of the company.

**The Detroit Appraisals.**—In addition to the appraisal of the properties of the Detroit (Mich.) United Railway within the one-fare zone now being made by Prof. E. W. Bemis for the city railway commission of Detroit, Professor Cooley, of the University of Michigan, is now engaged in an appraisal of the properties not only within the city but outside as well. Professor Cooley is making the appraisal for the State Railway Commission. By reason of having practically finished his appraisal of the Pere Marquette Railroad, Professor Cooley has been able to turn a large number of his experienced men on the Detroit United Railway work and it is now thought the appraisal of these properties will be finished before Christmas.

**San Francisco Municipal Railway Estimates.**—The San Francisco (Cal.) Municipal Railway bond fund is insufficient for the construction of the new lines for which it was voted, according to a report by Leonard Leavy, bookkeeper of the Public Works Board. The deficit is attributed to the extra cost of the cable system for the Church Street hill, which the supervisors lately ordered. The bonds of the issue of $3,500,000 that have been sold amount to $2,642,500. They brought a premium of $23,658. Whether the remaining $857,500 can be sold now is considered doubtful because of market conditions. For work already undertaken $1,915,567 has been expended. For final payments on contracts and finishing the present work, $718,226 is required. For new work the city engineer's estimate is $1,020,240, making a total of $3,654,033. If the remaining bonds are sold the available cash will total $3,523,658, leaving a deficit of $130,374.

**Conditions Normal on Joplin & Pittsburg Railway.**—The receipts of the Joplin & Pittsburg Railway, Pittsburg, Kan., for the first few weeks after the resumption of traffic, succeeding the strike of nearly three months, have been quite up to the receipts of the same period last year. The line is now operating on all its branches. The company is, however, using only two of the power houses, those at Pittsburg and at Franklin. It gets power from the Empire District Electric Company, from the Joplin station, through substations a short distance north of Joplin, at Asbury, half way between Joplin and Pittsburg, and at Scammon. The Joplin & Pittsburg Railway maintained a power house at Scammon before the strike. At that time arrangements had already been made for the transformation of this station into a substation of the Empire Company. The Empire's substation equipment had already been put into the building and when traffic on the Joplin & Pittsburg was resumed the sub-

station immediately began to supply current. The power house equipment in the Scammon building was not disturbed.

**City Borrows from Chicago Traction Fund.**—The Chicago City Council finance committee in seeking a means of raising $1,000,000 to insure the completion of a municipal recreation pier, devised a plan whereby this amount could be borrowed from the traction fund for four months, municipal bonds being deposited as security. At the present time this fund, which now includes approximately $14,000,000, is drawing 2¼ per cent interest when it is invested in anticipation of tax warrants. According to the new plan, the $1,000,000 fund for the completion of the recreation pier will draw 4 per cent interest. The finance committee decided to adopt this way of raising the necessary funds because bonds could not be sold except at a discount.

**Western Massachusetts Transportation Hearings.**—The transportation commission appointed by Governor Walsh of Massachusetts has been holding continued hearings within the past few days in the western part of the State. A strong general sentiment has developed in behalf of the construction of additional electric railways in Berkshire and Hampden Counties, the present train service and highway facilities being regarded as unsatisfactory. It was urged that if such lines could be built, water powers now running to waste could be utilized and a widespread movement started toward prosperity. It is expected that an appeal will be made to the next Legislature to have the State finance electric railway development in the Berkshire district unless private capital can be found to undertake the work.

**Plans for Conference of Mayors.**—Mayor Blankenburg of Philadelphia has been notified by the mayors of seventy-five cities throughout the country that they will attend the conference to be held in Philadelphia on Nov. 12, 13 and 14 to discuss public policies as to municipal regulation and control of public utilities. A general committee of well-known Philadelphians has been named by the Mayor to perfect plans for the conference and it has just agreed on a preliminary program. It is planned to have the sessions begin on the evening of Nov. 12, with a reception to mayors and delegates. The Friday morning session will be given over to a discussion of practical utility problems. In the afternoon the discussion will cover the regulation of utilities. Both these session will be held in the Bellevue-Stratford. The Friday evening session will be held in the auditorium of the Central High School and the subject for discussion will be local and state regulation of municipal utilities. Saturday morning, Nov. 14, in the Bellevue-Stratford, municipal ownership and operation will be discussed. In the afternoon the topic will be "Elements in the Constructive Utility Program." The evening session will adjourn to Witherspoon Hall, when holding companies and public utilities will be discussed by experts under the auspices of the American Academy of Political and Social Science.

**Plea for Inventory Rejected.**—The Supreme Court of Nebraska has decided against the State Railway Commission by refusing to issue a writ of mandamus to compel the Omaha & Council Bluffs Street Railway to file with the commission an inventory of its property. The company contended that a street railway does not come within the scope of the physical valuation law and that an inventory such as was desired by the commission would cost the company $7,500. A complaint asking for a reduction of car fares in Omaha is pending before the commission. The syllabus of the court's opinion follows: "The words 'railroad' and 'railway' as used in the physical valuation act (laws of 1909) held not to include street railways. Since such act declares that 'the term public service corporation when used in this article shall mean and embrace' certain named classes of such corporations, no other class of public service corporation is within its terms. The proper object of a court in construing a statute is to give effect to the intention of the Legislature, and where the language used in an act is ambiguous resort may be had to the history of its passage through the Legislature, if this throws any light on the meaning of the language used therein. When the Legislature has, upon the effort being made therein, refused to include certain classes of public service corporations in a physical valuation statute, the court will not include them therein by construction."

## PROGRAMS OF ASSOCIATION MEETINGS

### Central Electric Railway Association

The next meeting of the Central Electric Railway Association will be held at Fort Wayne, Ind., on Nov. 19.

### New York Electric Railway Association

An executive committee meeting of the New York Electric Railway Association was held on Oct. 22 at the Transportation Club, New York. Those present were James F. Hamilton, Schenectady; John J. Dempsey, Brooklyn; S. Walter Mower, Cooperstown; William O. Wood, Long Island City; Frank Hedley, New York, and Charles C. Dietz, Brooklyn. It was decided not to hold a quarterly meeting in the month of December this year on account of the closeness of the annual meeting and the mid-year meeting of the American Electric Railway Association. The early spring meeting of the New York Electric Railway Association will, however, be held as usual. Other matters of importance were considered by the committee.

### National Association of Railway Commissioners

The twenty-sixth annual convention of the National Association of Railway Commissioners will be held in the hearing room of the Interstate Commerce Commission in Washington, D. C., beginning Nov. 17. It is hoped that all the reports of the committees will be completed and sent to the secretary for printing and distribution at least thirty days in advance of the meeting. This will enable members to be better prepared intelligently to discuss the reports. James S. Harlan, chairman of the Interstate Commerce Commission, will deliver the address of welcome. Charles A. Prouty, director of valuation, will discuss the question of the valuation of common carriers subject to the act to regulate commerce. As no other special topics or addresses are scheduled, the time of the convention will be largely directed to the discussion and consideration of committee reports.

### Association of Railway Electrical Engineers

The seventh annual convention of the Association of Railway Electrical Engineers will be held at the Hotel La Salle, Chicago, Oct. 26 to 30. During the term of the sessions the nineteenth floor of the hotel will be given over to exhibits of electrical manufacturers and supply dealers making a specialty of equipment for car-lighting and railroad service.

The technical program of the convention will open Tuesday morning, Oct. 27, with an address by the president, C. R. Gilman, illuminating engineer of the Chicago, Milwaukee & St. Paul Railway, to be followed by the report of Secretary Joseph A. Andreucetti, Chicago & Northwestern Railway, Chicago. At the afternoon session reports will be submitted by the committees on loose-leaf binders for filing specifications and keeping specifications and standards to date, J. R. Sloan, chairman; on reciprocal relations, L. S. Billau, chairman; on specifications for wire crossings for potentials above 100 volts, J. R. Sloan, chairman, and on data and information, Edward Wray, chairman.

On Wednesday at the morning session reports will be submitted by the committees on standards, D. J. Cartwright, chairman, and on headlamps, C. R. Sugg, chairman, followed by a paper entitled "Communication to and Between Trains by Telegraph-Wireless, Telephone-Wireless and Telephone," by F. H. Milner, Union Pacific Railway, Omaha, Neb. At the afternoon session reports will be submitted by the committees on industrial trucks; on electric traction, and on specifications.

On Thursday at the morning session there will be reports from the committees on axle equipment, H. R. Bucks, chairman; on head-end equipment, K. R. Hare, chairman, and on standard rules for car wiring, S. W. Everett, chairman. At the afternoon session the committee reports on outside construction and yard lighting, H. M. Warren, chairman; on illumination, L. S. Billau, chairman, and on shop practice, G. W. Cravens, chairman, will be presented.

On Friday at the morning session a report is scheduled from the committee on yard facilities for charging, D. B. Pastorius, chairman, to be followed by the election of officers. There will be a dinner-dance on Friday evening.

# Financial and Corporate

## RECENT FINANCIAL TENDENCY

Discussion of plans for opening the New York Stock Exchange has been revived by the visit to this country of Sir George Paish, the English financial authority. Except that general conditions have improved materially since the declaration of war, practically the same problems present themselves for settlement in connection with the reopening that existed weeks ago. The governing committee of the exchange has not yet gone on record, and the discussion regarding the reopening is purely speculative, representing what particular individuals think may transpire or what they would like to have take place.

Pronounced ease was the feature of the market for foreign remittances on Oct. 21. It was reflected in a decline of demand sterling from 4.95¼ at the beginning to 4.94¾. Cable transfers fell to 4.95¼. The Continental exchanges showed sympathetic weakness. Francs declined to 5.08½ for checks and 5.08 for cables, while marks went down to 91¼ for checks and 91½ for cables. Loans in time money were negotiated on Oct. 21 in New York in small amounts at rates ranging from 6 to 7 per cent, the maximum figure applying principally to the shorter maturities. Call money was put out in a few small lots at 6 per cent.

## CHANGE IN STOCK CONTROL

The protective committee of the preferred shareholders of the New England Investment & Security Company, Springfield, Mass., composed of Moses Williams, Jr., Henry B. Cabot and E. V. R. Thayer, has concluded the purchase of the 1000 shares of common stock held by Sanderson & Porter, New York. Previous reference was made to this impending purchase in the ELECTRIC RAILWAY JOURNAL of Sept. 5. This stock, which was purchased by Sanderson & Porter in the summer of 1913, carried with it practical control of the New England Investment & Security Company, the vehicle through which the New York, New Haven & Hartford Railroad owned the electric railways in Springfield, Worcester and other towns in the western part of Massachusetts. The New Haven's interest is now represented by $13,700,000 of notes due in 1924. According to the New Haven dissolution decree, abstracted elsewhere in this issue, the railroad must also dispose of these notes before July 1, 1919, to parties not interested in its own organization.

Francis H. Dewey and Alexander G. Bullock, Worcester, and E. V. R. Thayer, Fitchburg, have been elected trustees in place of Sanderson & Porter's representatives, so that now the entire board of trustees represents the preferred stockholders. There are 40,000 shares of non-voting preferred stock outstanding, which are owned by about 1000 holders and on which dividends at 4 per cent are guaranteed by the New Haven Railroad. The purchase money was raised by a contribution of $10 a share by the preferred stockholders, which provided enough to carry the purchase through, although the purchase price itself is unknown.

Although no formal announcement has been made by the new management, Mr. Dewey in an interview expressed himself as follows:

"There will be no change of management at present. No attempt will be made to sell bonds or stock or to reorganize the properties, for the money market is not now in a condition for people to be interested in investments. As to the complete abolition of holding companies and what will be done in the matter of reorganization, these are matters that the trustees will decide in good time and of which the public will be kept informed through the newspapers."

Under the former arrangement the owners of the 1000 common shares selected four of the seven trustees and the owners of the 40,000 preferred shares selected only three. For several years all the properties, operating about 420 miles of street railway, have been controlled now by one set of owners of common stock and now by another set, the preferred stock, largely held by the investors in Springfield, Worcester and Boston, being legally in the position of a minority. Recently, however, several influential preferred shareholders became active in forming a protective committee, which has brought about the above change of control.

## ANNUAL REPORTS

### Boston Elevated Railway

The Boston (Mass.) Elevated Railway earned dividends of $1,193,970 during the fiscal year ended June 30, 1914, with a surplus of $63,199 for the period. The company's figures of operation, as reported to the Massachusetts Public Service Commission, showed operating revenues $820,709 greater than in the preceding year. The operating expenses were only $162,280 larger, yielding an increase of $658,428 in the net income from operation. Deductions from income increased $98,824 during the year. The deficit for 1913 was $496,377, and for 1912 it was $491,632, both of which are to be ascribed to the effect of the strike of 1912. There was no increase in the capital stock, which totals $23,879,400.

Below is a summary of the company's return to the commission, compared with the results for the preceding year:

| | 1914 | 1913 |
|---|---|---|
| Operating revenue | $17,629,617 | $16,808,908 |
| Operating expense | 11,297,862 | 11,135,581 |
| Net income from operation | $6,331,755 | $5,673,327 |
| Miscellaneous income | 156,361 | 159,419 |
| Total income | $6,488,116 | $5,832,747 |
| Fixed charges | 5,230,948 | 5,131,124 |
| Balance | $1,257,168 | $700,622 |
| Dividends | 1,193,970 | 1,197,000 |
| Surplus | $63,198 | *$496,377 |

*Deficit.

Traffic and operating statistics for the two years ended June 30 compare as follows:

| | 1914 | 1913 |
|---|---|---|
| Revenue car-miles | 57,990,436 | 57,784,319 |
| Revenue passengers | 343,181,049 | 326,352,863 |
| Employees | 9,842 | 9,882 |
| Maintenance of way and structures | $1,694,072 | $1,761,842 |
| Maintenance of equipment | $1,331,339 | $1,282,655 |
| General expenses | $1,729,665 | $1,773,597 |
| Traffic expenses | $13,157 | $16,048 |
| Transportation expenses | $6,529,626 | $6,301,400 |
| Operating ratio | 64.08 | 66.25 |

### New York Railways

The comparative statement of income, profit and loss of the New York (N. Y.) Railways for the years ended June 30, 1913 and 1914, follows:

| | 1914 | 1913 |
|---|---|---|
| Gross operating revenue | $13,860,837 | $14,065,158 |
| Operating expenses | 8,759,973 | 8,775,961 |
| Net operating revenue | $5,100,864 | $5,289,197 |
| Taxes | 1,092,105 | 1,169,895 |
| Income from operation | $4,008,759 | $4,119,302 |
| Non-operating income | 434,200 | 410,029 |
| Gross income | $4,442,959 | $4,529,331 |
| Income deductions: | | |
| Interest on underlying bonds, rents, etc. | $2,674,509 | $2,695,555 |
| Interest on New York Railways first real estate and refunding mortgage 4 per cent bonds | 651,838 | 651,838 |
| Total | $3,326,347 | $3,347,393 |
| Balance | $1,116,611 | $1,181,938 |
| Add: | | |
| Surplus, June 30, 1913 and 1912: | | |
| At beginning of year as adjusted | $46,101 | |
| Additions during year | 21,322 | |
| | 67,423 | 54,327 |
| Total available for interest on New York Railways adjustment mortgage 5 per cent income bonds | $1,184,034 | $1,236,265 |
| Deduct: | | |
| Interest on New York Railways adjustment mortgage 5 per cent income bonds | 1,112,675 | 1,190,164 |
| Surplus | $71,357 | $46,101 |
| Add: | | |
| Net income from Williamsburg Bridge local car operations | | 12,129 |
| Surplus June 30, 1914 | | $83,486 |

NOTE.—For purposes of comparison the operating expenses for the year ended June 30, 1913, are adjusted to include reserve for maintenance and depreciation.

Revenue from transportation for the year, excluding Williamsburg Bridge local car operation, was $13,421,681, a decrease of $184,172, or 1.35 per cent. For the first six

months of the fiscal year there was an increase in both gross and net earnings and in the number of passengers carried. During the second six months, however, there was a decrease on account of the snow storms during February and March, the generally less favorable weather conditions and the widespread business depression. The aggregate loss to the company on account of the storms, in conduit cleaning, snow removing, damage to pavement and track structure, and on account of excessive wear caused by vehicular traffic, including loss of passenger revenue, was approximately $500,000. The interruptions caused by the city subway construction also had a harmful effect upon some of the company's revenues, for although during the six months ended Dec. 31 all the so-called north and south lines showed a gain in receipts, the Lexington Avenue line suffered a heavy loss on account of the fact that delays thus caused had diverted traffic from that line.

The other street railway operating revenues for the period were $439,157, a decrease of $20,148, or 4.39 per cent. The three largest items of revenue under this heading were advertising, $325,000; sale of power, $90,703, and rent of tracks and terminals, $15,969. The total decrease was accounted for by decreases in the sale of power and equipment rentals from other companies approximating $50,000, which was partly offset by increases in advertising and rent of tracks and terminals, approximating $30,000.

The operating expenses decreased $15,988, or 0.18 per cent. The operating expenses for 1914 and 1913 include amounts reserved for maintenance and depreciation, the reserve for the year ended June 30, 1914, being $324,773, a decrease as compared with 1913 of $376,936. The charges for paving included in operating expenses amounted to $555,191, an increase over 1913 of $167,328. There was also an increase of $146,184 in the cost of snow removal. The amount actually expended for maintenance of track and roadway, electric line, building structures, etc., was $1,614,443, an increase over 1913 of $397,684. The expenditures for maintenance of equipment amounted to $832,951, a decrease as compared to 1913 of $61,613. The total maintenance expenditures increased $336,071 over the preceding year. The extraordinary charges in the nature of improvements and replacements included in the maintenance accounts amounted to $707,322, an increase of $145,260.

Taxes assignable to street railway operations decreased $77,789, or 6.65 per cent. All classes of taxes as accrued showed decreases, the greater portion of the reduction applying to real estate, special franchise and gross earnings and taxes. The combined cost of claims for the current year and those arising out of operation during the receivership and liquidated during this year amounted to approximately 6.4 per cent of the gross passenger revenue, as compared to 6.6 per cent last year. The number of serious personal injuries was reduced more than 12.8 per cent and the total number of accidents 10.4 per cent. Plaintiffs won only 34 per cent of all cases tried in the courts. The company voluntarily settled 3316 claims for $273,152 before suit was brought and compromised 1058 suits for $234,687 before trial, leaving as a result of contested suits 185 judgments paid, amounting to $58,519.

The reserve for injuries and damages during the first six months of the year was reduced from 8 per cent to 7½ per cent of the passenger revenue, but restored to 8 per cent by order of the Public Service Commission. The percentage of 7½ per cent, however, was adopted during the last six months. The report states that it usually takes five years to liquidate and extinguish completely all liability for accidents in any year and that no adjustment can be had as to the reserves for 1912 and 1913 until the liability for these years shall have become extinguished by payment, litigation or the statute of limitations. It is also stated that the new workmen's compensation law will increase the cost of employees' accidents, so that no considerable change in accident reserve should be made at this time.

The company showed a net increase of $24,171, or 5.89 per cent in operating income, which is accounted for by the additional interest revenue received on special funds. The profit and loss surplus amounting to $83,486 was composed of $83,254 interest on the $650,000 note of the joint reorganization committee assumed by the company Oct. 3, 1912, and an undistributed balance of $232.

During the year the company completed and placed in service 175 stepless cars, 45 storage battery cars and 29 electric trucks. The report contains tables and schedules showing the capitalization of the company, the railroads leased and operated under agreement and the welfare work conducted by the company. In regard to the workmen's compensation law, it is stated that the difference between insurance in a stock company or the state fund and self-insurance appeared so disproportionate that when allowance was made for medical expense, the economy seemed to be on the side of self-insurance.

The report emphatically states that the very large expenditure for street paving in the past and at present is extraordinarily burdensome and interferes with the proper carrying out of plans for the physical improvement of the company's property. The company feels that a change in paving requirements is not only justified by existing conditions, but it is absolutely necessary to conserve its revenues for rendering efficient transportation service. It is believed that one party, preferably the city, should be responsible for the condition of the paving in all city streets from curb to curb, and that the railways should make some satisfactory arrangement with the city to pay a reasonable and proper proportion of the maintenance cost, say on the basis of a fixed sum per running foot of single track per annum, which would relieve the companies entirely of their existing paving obligations and place in the hands of the city the question of paving or repaving the public streets.

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**Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.**—The independent bondholders committee of the Birmingham, Ensley & Bessemer Railroad announced on Oct. 9 that A. R. Patterson, general auditor Stone & Webster Management Association, whom they had employed to investigate the affairs of the company, had been informed by the general auditor of the railway that he was unable to give any definite information regarding the railways' vouchers, for the books were being examined by certified public accountants employed by other interests.

**Boston (Mass.) Elevated Railway.**—Charles P. Hall has resigned as a director of the Boston Elevated Railway on account of his appointment as a trustee of a majority of the Boston & Maine Railroad stock under the recent decree entered in the government suit against the New York, New Haven & Hartford Railroad.

**Brooklyn (N. Y.) Rapid Transit Company.**—The Brooklyn City Railroad recently anticipated a payment of an instalment of $100,000 due on account of the debt to the Brooklyn Heights Railroad under the terms of the settlement for $1,650,000 of the suit brought against it by the latter. There is now said to be due about $400,000 of the amount.

**City Service Company, New York, N. Y.**—In a recent letter to stockholders H. L. Doherty, president Cities Service Company, stated that the machinery of credit in this country is gradually being adjusted to overcome the strain caused by war conditions but that there have been no developments which would warrant the directors in changing their policy of deferring dividends. According to Mr. Doherty, since July 30 action has been taken by various corporations in this country, discontinuing, deferring or reducing payments of interest and dividends on approximately $2,000,000,000 of capital and to the extent of practically $100,000,000 in annual payments to security holders. Every action of this character is depressing but should not be interpreted as an indication of added difficulties. On the whole, the properties of the Cities Service Company are making a satisfactory showing, with encouraging news from time to time of added improvement. With the exception of sales of crude oil, there has been no marked effect to lessen the earnings of the various properties. Concerning the recent injunction against the 3-cent fare ordinance in Toledo, Mr. Doherty said: "The effect of this restraining order will be to increase substantially the earnings of the Toledo street railway lines. It is very significant that the decision of Judge Killits was received with general approval by the Toledo public. Since the Toledo properties came under the present management the feeling toward the local utilities has been steadily changing until at present relations are extremely cordial."

**Cleveland (Ohio) Railway.**—As noted in the Electric Railway Journal of Oct. 17, the Ohio Public Utilities Com-

mission has authorized the Cleveland Railway to issue $2,382,600 of common stock to be sold for the highest price obtainable, but not for less than par. The proceeds are to be used for the following additions, extensions and permanent improvements: land for terminals, $50,000; buildings, $1,065,000; track, $585,000; power, $284,500, and rolling stock, $400,000.

**Columbus Railway, Power & Light Company, Columbus, Ohio.**—The Ohio Public Utilities Commission on Oct. 17 granted the Columbus Railway, Power & Light Company permission to issue $7,876,000 of first mortgage gold bonds or an equal amount of 4 per cent preferred stock to refund outstanding bonds of its underlying companies.

**Empire United Railways, Syracuse, N. Y.**—C. W. Seamans, New York, W. A. Jones, Newark, and J. M. Gilbert, E. I. Edgcomb, and A. H. Cowie, all of Syracuse, have been elected directors of the Empire United Railways to succeed other men who acted as temporary directors. E. D. Metcalf has resigned as vice-president and a director.

**Eastern Texas Electric Company, Beaumont, Tex.**—Stone & Webster, Boston, are offering for sale at 98½ and interest, to yield about 6.9 per cent, three-year 6 per cent notes of the Eastern Texas Electric Company, due July 1, 1916. The notes are callable as a whole at 100 and interest on any date at thirty days' notice. The notes are a direct obligation of the company, which covenants that, if any new lien is placed on the property, the notes shall be secured equally with the new obligation. The notes are followed by $1,400,000 of 6 per cent preferred stock and $1,400,000 of common stock.

**Humboldt Transit Company, Eureka, Cal.**—The Railroad Commission of California has rendered a decision authorizing the Humboldt Transit Company to issue and pledge $50,000 of first mortgage 5 per cent bonds with the Pacific Coast Casualty Company as collateral security for a surety bond.

**Long Island Railroad, New York, N. Y.**—The Public Service Commission of the Second District of New York has approved an issue of $1,000,000 of the Long Island Railroad's 5 per cent gold equipment trust obligations, series A. The total issue will be for $1,060,000 to be sold at not less than par and accrued interest, pursuant to an arrangement with the Fidelity Trust Company and Edward P. Gest as trustee. The proceeds, plus a cash payment of $125,000, will be used in the acquisition of the following equipment: Twelve steel passenger cars, three steel passenger and baggage combination cars, forty steel motor passenger cars, fifteen steel motor passenger and baggage cars, twenty steel baggage and express cars, four steel baggage and mail cars, and three motor passenger, baggage and mail cars. The car trust certificates, guaranteed principal and interest by the Long Island Railroad, are to be taken up in ten annual payments of $106,000 and interest.

**New York (N. Y.) Railways.**—The following committee has been formed to represent large holdings of the New York Railways thirty-year 5 per cent adjustment mortgage income bonds: John P. Kingsley, president New York Life Insurance Company; William A. Day, president Equitable Life Assurance Society; Haley Fiske, vice-president Metropolitan Life Insurance Company, and Allan Ford, president State Street Trust Company, Boston. The committee announces that the bondholders are entitled to vote for and elect five directors at the annual meeting in December, and that it will receive proxies for such election.

**Northampton (Mass.) Street Railway.**—The stockholders of the Northampton Street Railway have elected William A. Stevenson, Florence, and Charles E. MacIntosh, Holyoke, directors to succeed N. D. Winter, Springfield, resigned, and the late W. S. Loomis, Holyoke.

**Northern Electric Railway, Chico, Cal.**—Judge Dooling in the United States District Court of San Francisco on Oct. 5 decided to appoint John P. Coghlan, attorney for the Pacific Gas & Electric Company, as receiver of the Northern Electric Railway. Mr. Coghlan is reported as not intending to make any changes in personnel. According to a circular issued by the Sloss Securities Company, when the trustees were appointed it was estimated that the revenues of the Northern Electric Railway would provide for betterments and interest except for an estimated shortage of from $200,000 to $250,000, which should be made out of the revenues on the Scloss Securities Company. In February and May, 1914, the trustees paid the note interest, but unusual rains and floods made extensive repair work necessary and the operating revenues also did not keep pace with the estimate. On June 1 the note interest was defaulted and since that time, notwithstanding substantial economies effected, earnings continued to fall off, the decrease being most marked after the outbreak of the European war. Not only were the revenues insufficient to meet the interest on underlying bonds due Oct. 1, but they also failed to provide for the necessary maintenance of the physical properties. In view of these conditions a receiver was necessary, but it is hoped to terminate the receivership as soon as a plan of reorganization can be agreed upon. At a recent meeting of creditors five protective committees were appointed to look after interests of the holders of the different classes of securities and of the unsecured creditors.

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—The Railroad Commission of California has authorized the Oakland, Antioch & Eastern Railway to pledge $105,000 of first mortgage 5 per cent thirty-year bonds as collateral for a note of $62,500, provided the bonds be returned to the treasury upon the collection of the assessment delinquent on Oct. 8.

**Pacific Gas & Electric Company, San Francisco, Cal.**—The Pacific Gas & Electric Company is continuing its public offering of a block of its immediate issue of $12,500,000 of new first preferred cumulative 6 per cent stock at the original price of 82½, yielding 7.27 per cent on the investment. About $9,000,000 of this stock already has been sold to more than 3500 purchasers.

**Richmond & Henrico Railway, Richmond, Va.**—Carrying out the order of Judge Crump on Sept. 16 directing the sale of the properties of the Richmond & Henrico Railway, unless the company paid by Sept. 26 past-due interest of $250,000 on its bonds, Commissioners Samuel L. Kelley and Samuel A. Anderson have served notice that they will sell the property at public auction on Nov. 5. In accordance with the court order, the property will be disposed of as an undivided whole. Besides 7½ miles of railway track in the city of Richmond and a railway franchise, the holdings embrace valuable viaducts, a power house, carhouses, rolling stock and other railway appurtenances. The sale will bring to a conclusion the proceedings brought against the railway in June, 1913, by the Union Trust Company, Ltd., Toronto, Can., underwriter of its bond issue. At that time Judge Crump appointed the Virginia Trust Company as receiver, and this company has operated the road for more than a year, issuing receiver's certificates to meet expenses of operation.

**San Diego (Cal.) Electric Railway.**—The Railroad Commission of California recently authorized the San Diego Electric Railway to execute a mortgage to the Union Trust Company, San Francisco, to secure an authorized issue of $10,000,000 of general first lien 5 per cent forty-year sinking fund gold bonds and to issue thereunder $4,497,000 of bonds at 85. The proceeds are to be used to refund outstanding bonds and other debt, to return $302,438 to income and to pay for necessary additions and betterments. The application to the commission was noted in the ELECTRIC RAILWAY JOURNAL of July 11.

**San Francisco-Oakland Terminal Railways, Oakland, Cal.**—W. W. Garthwaite, member of the advisory committee in charge of the F. M. Smith interests, has been named a director in the San Francisco-Oakland Terminal Railways, to take the place of George G. Moore, who recently relinquished control of the road following his failure, through war conditions, to carry out his proposed refinancing plans.

**Scioto Valley Traction Company, Columbus, Ohio.**—The income statement of the Scioto Valley Traction Company for the year ended June 30, 1914, shows gross revenue of $485,696, an increase of $21,460 over the previous year. Operating expenses totaled $279,858, an increase of $18,241, caused by flood ravages and the extension of facilities for handling freight. The latter charge arose from the policy of the company to build the road out of earnings. The surplus for the year was $31,054, an increase of $2,105, the total surplus

and reserves being $172,160 at the end of the fiscal year. The road carried 1,380,405 passengers during the year, in comparison with 1,332,492 in 1913. It hauled 77,146,153 lb. of freight, a gain of 12,885,907 lb., over the previous year.

**Southern Traction Company of Illinois, East St. Louis, Ill.**—William F. Trautman, formerly United States district attorney of eastern Illinois, was recently appointed one of the receivers for the Southern Traction Company in Illinois and the Missouri receiver for the company by Judge Francis M. Wright of the District Court in East St. Louis. Mr. Trautman was chosen to fill the vacancy made by the resignation last June of William Lorimer, Chicago.

## DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Maine, quarterly, one-half of 1 per cent, common.

Cape Breton Electric Company, Ltd., Sydney, N. S., 3 per cent, preferred; 3 per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Montreal (Que.) Tramway, quarterly, 2½ per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

## ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

| Period | | | Gross Earnings | Operating Expenses | Net Earnings | Fixed Charges | Net Surplus |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $72,661 | *$34,761 | $37,900 | $17,402 | $20,498 |
| 1 " | " | '13 | 74,248 | *30,832 | 43,416 | 17,354 | 26,062 |
| 12 " | " | '14 | 777,080 | *371,629 | 405,451 | 208,897 | 196,554 |
| 12 " | " | '13 | 747,311 | *339,598 | 407,713 | 206,398 | 201,315 |

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $100,717 | *$73,837 | $26,880 | $17,185 | $9,695 |
| 1 " | " | '13 | 111,253 | *77,399 | 33,854 | 14,919 | 18,935 |
| 2 " | " | '14 | 198,085 | *154,766 | 43,714 | 34,106 | 9,608 |
| 2 " | " | '13 | 215,051 | *150,789 | 64,261 | 29,593 | 34,667 |

CONNECTICUT COMPANY, NEW HAVEN, CONN.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $823,697 | *$571,018 | $252,678 | $98,889 | $153,789 |
| 1 " | " | '13 | 860,800 | *529,397 | 331,402 | 90,499 | 240,903 |
| 2 " | " | '14 | 1,644,350 | *1,142,759 | 501,590 | 196,219 | 305,371 |
| 2 " | " | '13 | 1,717,643 | *1,049,816 | 667,828 | 180,996 | 486,832 |

GRAND RAPIDS (MICH.) RAILWAY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $114,380 | *$75,374 | $39,006 | $13,520 | $25,486 |
| 1 " | " | '13 | 116,159 | *80,279 | 35,880 | 15,173 | 20,707 |
| 12 " | " | '14 | 1,292,726 | *832,618 | 460,108 | 154,718 | 305,390 |
| 12 " | " | '13 | 1,280,852 | *765,667 | 515,185 | 178,334 | 336,851 |

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $180,508 | *$107,927 | $72,581 | $41,900 | $30,681 |
| 1 " | " | '13 | 178,431 | *116,727 | 61,704 | 40,002 | 21,702 |
| 12 " | " | '14 | 2,249,944 | *1,379,527 | 870,417 | 502,326 | 368,091 |
| 12 " | " | '13 | 2,168,166 | *1,274,609 | 893,557 | 452,801 | 440,756 |

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $52,442 | *$32,486 | $19,956 | $7,876 | $12,080 |
| 1 " | " | '13 | 50,100 | *29,437 | 20,662 | 7,699 | 12,963 |
| 2 " | " | '14 | 102,176 | *63,425 | 38,750 | 15,752 | 22,998 |
| 2 " | " | '13 | 101,490 | *59,374 | 42,116 | 15,253 | 26,863 |

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $38,561 | *$42,967 | $4,405 | $11,564 | †$15,969 |
| 1 " | " | '13 | 37,516 | *48,999 | 11,483 | 9,750 | †21,233 |
| 2 " | " | '14 | 78,769 | *85,324 | 6,555 | 20,589 | †27,144 |
| 2 " | " | '13 | 74,084 | *96,443 | 22,359 | 20,552 | †42,911 |

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Sept., | '14 | $1,949,440 | $1,113,964 | $835,476 | $807,970 | $27,506 |
| 1 " | " | '13 | 1,999,344 | 1,154,067 | 845,277 | 801,001 | 44,275 |
| 3 " | " | '14 | 5,813,676 | 3,362,684 | 2,450,993 | 2,426,099 | 24,894 |
| 3 " | " | '13 | 5,965,989 | 3,502,557 | 2,463,432 | 2,398,647 | 64,785 |

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $487,264 | *$275,914 | $211,350 | $186,186 | $25,164 |
| 1 " | " | '13 | 556,152 | *280,110 | 276,042 | 172,166 | 103,876 |
| 2 " | " | '14 | 6,575,622 | *3,336,059 | 3,239,563 | 2,141,145 | 1,098,418 |
| 2 " | " | '13 | 6,683,992 | *3,316,515 | 3,367,477 | 1,906,293 | 1,461,184 |

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '14 | $537,859 | *$351,133 | $186,726 | $121,035 | $65,691 |
| 1 " | " | '13 | 558,784 | *370,614 | 188,169 | 105,306 | 82,863 |
| 2 " | " | '14 | 1,075,832 | *705,234 | 370,598 | 237,299 | 133,299 |
| 2 " | " | '13 | 1,188,649 | *700,400 | 438,249 | 210,612 | 227,637 |

*Includes taxes.
†Deficit.

# Traffic and Transportation

## FARE INCREASE DENIED

### Railroad Commission of California Denies Fare Increase to the Southern Pacific Company

The petition of the Southern Pacific Company to raise its one-way and monthly commutation rates between San Francisco and Alameda County points has been denied by the State Railroad Commission of California. The commission has also denied all of the other petitions that were before it affecting rates within Alameda County. Some of these petitions were brought by citizens and commercial bodies of Oakland and other Alameda County places and asked for a reduction of certain rates charged by the company. The commission orders that within twenty days the Southern Pacific Company and other interested parties present in writing to the commission their proposed schedule of rates to and from points beyond Seminary Avenue and upon the Stonehurst line, both for commutation and single fares, and it announced that unless an amicable arrangement of these issues was determined by the company on one side and residents concerned on the other, the commission would make a subsequent order with reference thereto. Those portions of the applications and complaints applying to the rates involved in that case were reserved for future determination.

The commission states that the Southern Pacific Company has been very considerate of the people of the east bay territory in the extension of its line and the extension of its $3 commutation and 10-cent single-fare rates, and expresses the opinion that it does not believe the company should be required to accord such rates to portions of the east bay cities and Alameda County other than those points to which they have been voluntarily accorded or established. It is suggested, however, that on account of the confusion which exists, it would be better for the representatives of the company, the protestants and the rate department of the commission, to arrange a uniform and proper scale of commutation and single-fare rates between San Francisco and points not now accorded the $3 monthly commutation rate and the 10-cent single-fare rate.

In its opinion the commission says in part:

"While the commission would under no circumstances suggest that improvements and substitutions, such as those brought about by the company in electrifying these lines, should be made without hope of return on the part of the agency making them, yet it is well to bear in mind that often it is necessary to build for the future; and if, as a matter of fact, the officials making the substitution were aware that under the then existing arrangement an adequate return would be made, yet under the substituted arrangement such an adequate return could only be expected after a considerable lapse of time, this fact should be considered in passing upon an application to increase rates subsequent to the change.

"We do not believe that under the circumstances under which certain suburban lines of the company were constructed in Oakland and Berkeley, this company has a right to impose upon its patrons a rate sufficient to return to it the amount which otherwise should be returned, on the ground that it has constructed facilities in excess of the necessities of the patrons. We believe the company was justified in the electrification of these lines, but are not of the opinion that it was justified in the construction of some of the added lines, except in contemplation of increased traffic in the future. Utilities are always required to have an eye to the future and they should ultimately be paid for the expenditures made.

"In the case here involved we feel no hesitancy in saying that the strictest presumptions of law should be adhered to against this company, not for the purpose of confiscating its property, but for the purpose of preventing the confiscation of tremendous values in the property of the residents of Alameda County. Thousands upon thousands of people have built their homes in these suburban communities and have paid prices for their property in contemplation of the reasonableness of these rates voluntarily accorded by this carrier. When through a long period of

years a transportation company has voluntarily accorded a rate to a community on the faith of which large investments have been made, and when again the same agency has voluntarily and under no legal compulsion incurred great expenditures and largely extended its facilities, the *prima facie* reasonableness which attaches to rates which have been voluntarily accorded becomes, if not conclusive, very strongly persuasive upon any regulatory authority.

"An increase of the commutation rate alone will confiscate or take away from (the term used is immaterial) the value of the residence of every person in the territory here involved who is forced by business reasons to commute to San Francisco. Confiscation in this case looks both ways, and it does not lie in the mouth of this carrier to urge its own confiscation in utter disregard of the confiscation which it, if permitted to have its way, will have brought about among innocent people who are its patrons. Besides, we do not treat as lightly the provisions in the franchises granted by the municipalities involved as the company seems willing to do."

## HEARING ON CHARLESTOWN SERVICE

The Massachusetts Public Service Commission held a hearing on Oct. 15 on the petition of the Charlestown Improvement Association for the restoration of service on the lines of the Boston Elevated Railway between Sullivan Square and Dorchester Street via Main Street, and between Sullivan Square and Pleasant Street via Bunker Hill Street. It appeared that these facilities had been withdrawn following the trial installation of a complete loop service from Sullivan Square through Main Street and Bunker Hill Street to Sullivan Square, and vice versa, the latter having been ordered by the commission several months ago in an effort to meet a demand for local service. The petitioners generally favored the restoration of the old service, which afforded opportunities for through travel in and out of Boston via the Tremont Street subway.

For the company, H. B. Potter, assistant to the second vice-president, pointed out that the original service was preferable to the present facilities and expressed the willingness of the company to restore it. The company is opposed, however, to continuing the loop service, which yielded only twenty-six circuit passengers in an eighteen-hour day, and it is opposed to offering service which enables a patron to go to City Square, Charlestown, from Sullivan Square, do a certain amount of shopping and return home for a single fare. Chairman McLeod stated that he doubted the commission's power to order the company to grant such transfers, as the road's charter only requires it to give transfers covering a ride in the same general direction. It was proposed that the loop service be retained on a thirty-minute headway, but the company's view was that a city line which would not be profitable on a twenty-minute headway or less should not be maintained. Chairman McLeod said that in establishing the Bunker Hill-Main Street service experimentally the board intended to test the application of interchange facilities found useful elsewhere on the Boston rapid transit system and recognized that the company had always opposed the loop service. The case was taken under advisement.

**Metal Tickets in Lexington.**—The Kentucky Traction & Terminal Company, Lexington, Ky., has begun the sale of six metal disks for 25 cents in place of paper car tickets. The disks are wrapped at the office of the company in envelopes bearing the name of the company.

**Increase in Fare Sought.**—Officials of the Charleston-Isle of Palms Traction Company, Charleston, S. C., have filed a petition with the Railroad Commission of South Carolina asking for permission to increase the rates from 25 to 40 cents between Charleston and the Isle of Palms.

**Increase in Fares Asked.**—The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has filed a petition with the Railroad Commission of South Carolina for an increase in the rates on its line in that State from 1 cent to 2 cents a mile. A hearing on the application was set for Oct. 22.

**Petition for Reduction in Fare Rejected.**—The petition of Frank B. Fuller, Schofield, against the Wausau (Wis.) Street Railway, asking that a 5-cent fare be granted between Schofield and Wausau, has been dismissed by the State Railroad Commission, which declared upon investigation that the present fare is low enough.

**Reducing Transfer Abuses in St. Paul.**—No arrests have been made since July for violation of the ordinance passed in St. Paul in April, 1914, providing for the prosecution of persons attempting to use transfers not obtained by them on cars. The number of transfers issued by the St. Paul City Railway since the ordinance went into effect is said to have decreased materially over the same period last year.

**Far Side Stop in Yonkers.**—The Common Council of Yonkers, N. Y., has passed an ordinance requiring all the cars of the Yonkers Railroad to stop on the far side of crossings. The Common Council has also passed an ordinance prohibiting smoking on its cars. The company has had difficulty in enforcing the rule and the ordinance was passed to empower policemen to arrest passengers if necessary.

**Recording Joy Riders.**—Conductors and motormen of the Southwest Missouri Railroad, Joplin, Mo., have been supplied with cards on which they will make reports of fast or careless driving and other infractions of the traffic law by the drivers of automobiles. It is expected that these cards will be of value to the company in case of accidents in which a driver figures who has a "record" on the company's books.

**Reduction in Fare on Municipal Line Rejected.**—The Supervisors of San Francisco, Cal., by a vote of twelve to six, have rejected the plan to reduce the fares on the San Francisco Municipal Railway to six tickets for 25 cents or twenty-five for $1. The opinion prevailed that until the municipal system had been completed it was not good business policy to reduce the fares on the main lines, which are expected to sustain the system.

**Increase in Fares on Municipal Line.**—The City Councils of Port Arthur and Fort William, Ont., have approved a new schedule of fares for the municipal electric railways in the cities and on the lines connecting the two cities. The new fare is a straight 5-cent one, and the tickets are five for 25 cents. Limited tickets for workmen and school children's tickets will remain as at present. The new schedule went into effect on Oct. 1.

**Baseball Traffic in Boston.**—The Boston *News Bureau* of Oct. 14 said: "On Monday for forty-five minutes following the world series baseball game at Fenway Park, the Boston Elevated Railway handled 45,000 passengers, or 1000 a minute. Of course there were many thousands outside the park who were unable to gain admittance and who used the street railway. If the elevated carried to the game as many as it carried from it, the road must have handled 90,000 passengers in all—a new record in the annals of Boston street railway transportation."

**"Seeing Wichita" Service.**—The Wichita Railroad & Light Company, Wichita, Kan., put into service during the recent dry-farming congress a "Seeing Wichita" car which made two trips a day over the city. The charge for a trip was 25 cents for each person. The company also adorned all employees with red silk badges reading "Ask Me." The conductors especially were instructed to answer the questions of strangers so far as possible, as to the location of buildings and streets, and the badges are said to have produced a marked freedom of questioning among the passengers.

**Extension of Cambridge Transfers.**—The Massachusetts Public Service Commission has issued an order requiring the Boston (Mass.) Elevated Railway to extend the free transfer privileges at Central Square, Cambridge, so that passengers boarding inward-bound Western Avenue cars between Central Square and the intersection of Market Street and Western Avenue, Brighton, may transfer to cars for Pearl Street. Prior to the decision the transfer privilege was restricted to passengers boarding cars in Cambridge. Under the new arrangement complete journeys may be made for a single fare between points on two subordinate but connecting lateral lines.

**St. Louis Traffic Figures for Three Months.**—The quarterly report of the United Railways, St. Louis, Mo., filed with the city register, shows a falling off of about 4,000,000 in the number of passengers carried during the three months ended Sept. 30, as compared with the previous quar-

ter. It also shows a loss of more than 2,000,000 as compared with the quarter ending Sept. 30, 1913. During the last quarter, 57,994,224 passengers were carried. During the previous quarter, 61,959,691 passengers were carried and during the quarter ending Sept. 30, 1913, a total of 81,593,938 was carried. During the last quarter, also, the number of trips made by the cars fell off about 30,000. The average number of cars operated on Sundays during the last quarter was 868; on Saturdays it was 1202 and on other week days, 1278.

**Highway Accidents in New York in September.**—Vehicles caused the death of seventy-two people in Greater New York during September, according to the National Highways Protective Society. Of this number forty-five were children and twenty-seven adults. Thirty-five of the children were killed by automobiles, eight by wagons and two by trolley cars. Of the twenty-seven adults killed in the city seventeen met their death by automobiles, five by wagons and five by trolleys. In New York State outside the greater city, seventy-one persons met their death by means of vehicles during September. Of these, forty-four were killed by automobiles, three by wagons, five by trolley cars and nineteen at highway railroad grade crossings. In New Jersey sixteen people were killed during September by automobiles, seven by wagons and eighteen at highway railroad grade crossings.

**Connecticut Mail Suspension Order.**—The Post-office Department at Washington, D. C., has modified its orders of June 23 relative to the electric car mail service, formerly performed by the Connecticut Company, so as to state the effective date of the order as June 20 instead of June 21, which was originally announced. The order discontinued the following electric railway mail routes: Hartford to South Glastonbury; Hartford to East Windsor Hill; Hartford to Wilson; Hartford to Unionville; Windsor to Rainbow; New Haven to Highwood Branch; Hartford to Station A; New Haven to West Haven Branch; Waterbury to North Woodbury; Rockville to Love Lane; Hartford to Gildersleeve; Hartford to Wethersfield; Stratford Station, Bridgeport, to Oronoque; Hartford to Newington. The statement of the company issued in connection with the discontinuance of the electric railway mail service was published in the Electric Railway Journal of June 27, 1914, page 1470.

**Operating Figures Filed in Rochester Fare Case.**—The New York State Railways has filed with the Public Service Commission of the Second District and with the corporation counsel of Rochester three sets of figures covering the cost of operating the lines of the Rochester division and the profits obtained from the lines for the years ending June 30, 1913 and 1914. The figures were compiled and submitted upon the application of Assistant Corporation Counsel Benjamin B. Cunningham, who is in charge of the interests of the city in its application to the commission for a 3-cent fare in Rochester in the rush hours of the morning and evening. The figures just filed supplement others filed recently which had to do only with the receipts in the rush hours, and the twenty-four hours for two months only. Those figures were desired by the commission for the purpose of showing what per cent of reduction was involved in the city's demand to decrease the fare in the 5-cent zone in the rush hours to 3 cents.

**Public Safety Commission in Portland.**—Mayor Albee, of Portland, Ore., has appointed a public safety commission for the city, with Harry P. Coffin as chairman. The commission will devote its entire attention to the prevention of accidents and the saving of human life through public education. The members of the commission are to take up various phases of public safety work. Each department head will organize the work of his section in the most effective way for carrying on the safety campaign. The commission is composed of the following gentlemen: Harry P. Coffin, chairman, in charge of traffic; B. F. Boynton, of the Portland Railway, Light & Power Company, secretary, in charge of electric transportation lines; F. L. Bruckhalter, railroad transportation lines; L. R. Alderman, schools; A. M. Churchill, Fire Chief E. F. Dowell, and Battalion Chief Stevens, fire prevention; Police Captain John T. Moore, general safety; Marshall N. Dana, industrial safety; Horace E. Thomas, publicity; Robert L. Witherol, building safety.

# Personal Mention

**Mr. E. D. Metcalf** has resigned as vice-president and a director of the Empire United Railways, Syracuse, N. Y.

**Mr. Arthur S. Pierce,** formerly assistant treasurer of the Northwestern Elevated Railroad, Chicago, Ill., has been elected treasurer to succeed M. B. Van Zandt, deceased.

**Mr. C. F. Hewitt,** who has been assistant general manager of the United Traction Company, Albany, N. Y., has been appointed general manager, succeeding Mr. James F. Hamilton.

**Mr. James P. Barnes,** general manager of the Syracuse & Suburban Railroad, Syracuse, N. Y., will be appointed resident general manager of the Buffalo, Lockport & Rochester Railway, with headquarters probably in Rochester.

**Mr. James F. Hamilton** has resigned as general manager of the United Traction Company, Albany, N. Y., to devote all his time in the future to the Schenectady Railway, which he managed jointly with the United Traction Company.

**Mr. Lee Howell,** general freight agent of the Louisville & Nashville Railroad, with headquarters in Evansville, Ind., has been elected president of the Evansville Suburban & Newburg Railway, to succeed the late Frederick W. Cook.

**Mr. George Theis, Jr.,** president of the Arkansas Valley Interurban Railway, Wichita, Kan., has been elected president of the Western Biscuit Company, Wichita, a company doing an extensive business in crackers and candy in the West.

**Mr. J. G. Baukat,** who was recently with the National Steel Car Company in Canada, has become connected with the Hydroelectric Power Commission of Ontario as mechanical engineer in charge of car design and the design of shops.

**Mr. C. Loomis Allen** will be elected vice-president of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., in charge of operation, arrangements having been made with Allen & Peck, Inc., by which that firm will take over the operation and management of the property, reporting to the president and the executive committee.

**Mr. Harrison B. Riley,** president of the Chicago Title & Trust Company, has been elected chairman of the executive committee and a member of the board of operation of the Chicago Surface Lines and chairman of the city railways controlling committee, succeeding Mr. Ira M. Cobe, resigned. Mr. Riley has also been elected a member of the governing committee of the Chicago Elevated Railways.

**Mr. W. W. Freeman,** president of the Columbia Gas & Electric Company, with headquarters in Cincinnati, Ohio, has been elected president of the Union Light, Heat & Power Company and the South Covington & Cincinnati Street Railway to succeed Mr. James C. Ernst, resigned. Mr. Polk Laffoon, secretary of the railway company, will succeed Mr. Ernst as a director in the company.

**Mr. L. D. Pellisier,** recently elected president of the Holyoke (Mass.) Street Railway to succeed the late William S. Loomis, was tendered a banquet at the Holyoke Club recently held by the head of the departments of the company. Mr. S. D. Nevins, secretary-treasurer of the company, presided as toastmaster. During the evening Mr. Pellisier was presented with a silver loving cup suitably inscribed as a token of esteem from the men.

**Mr. George W. Anderson,** of the Massachusetts Public Service Commission, has been nominated by President Wilson to the post of United States attorney for the district of Massachusetts. Mr. Anderson was born in Acworth, N. H., fifty-three years ago, was educated at Cushing Academy, Ashburnham, Mass., at Williams College and Boston University Law School. He began to practise law in Boston in 1890 and was prominent in the recent Haverhill Gas case before the Massachusetts Gas & Electric Light Commission. He was appointed to the Public Service Commission last year upon its creation and was active in the recent proceedings of the federal government in connection with the New Haven Railroad situation.

**Mr. Ira M. Cobe** has resigned all his Chicago connections and has gone to make his home permanently in Northport, Maine. The Chicago Surface Lines announce the resignation of Mr. Cobe as chairman of the executive committee of

the surface lines, as chairman of the executive committee of the Chicago City & Connecting Railways, and as a member of the board of operation of the Chicago Surface Lines. Ill health was assigned as the cause. Mr. Cobe has tendered his resignation as member of the board of directors and executive committee of the Northwestern Elevated Railway and of the governing committee of the Chicago Elevated Railways. Mr. Cobe also has resigned from the directorate of the Chicago Title & Trust Company and it is expected that he will retire from the National Bank of the Republic.

**Mr. Richard McCulloch,** who has been vice-president and assistant general manager of the United Railways, St. Louis, Mo., has been appointed general manager in addition to vice-president to succeed his father, the late Capt. Robert McCulloch, but no successor has been elected to Captain McCulloch as president of the company. Mr. Richard McCulloch was born in St. Louis in 1869 and was graduated from Washington University in 1891. He engaged in mining and later became connected with the Cass Avenue & Fair Grounds Railway, St. Louis, and subsequently with the consolidated system. After several years spent in railway work in Europe Mr. McCulloch returned to the United States to accept a position under his father with the Chicago City Railway. When Captain McCulloch was appointed to the United Railways his son entered that company under him as assistant general manager.

## OBITUARY

**Isaac Ellsworth,** one of the pioneers in street railway work in Milwaukee, Wis., is dead. He was eighty-two years old. Mr. Ellsworth was born in Ulster County, N. Y., and entered business in Milwaukee in 1856. In 1869 he and George F. Lynch purchased the property of the Milwaukee City Railway, with which he continued actively for many years.

**M. J. Kenney,** superintendent of the lighting department of the Little Rock Railway & Electric Company, Little Rock, Ark., is dead. Mr. Kenney was born in Elizabeth, N. J., and for the last fourteen years was continuously in the service of the Little Rock Railway & Electric Company. He is survived by a widow and daughter.

**Stuart Richardson,** who held the position of tramways engineer to the Wellington (N. Z.) City Corporation, died on Sept. 11 after a brief illness. Mr. Richardson was born at Swansea, England, on Jan. 9, 1863. He obtained his training as an electrical engineer with the Brush Company at Loughborough. After severing his connection with that company he entered the service of the Leicester Corporation and subsequently was appointed to the position of city electrical engineer, in which capacity he continued until he left for New Zealand to take up the management of the New Zealand Electrical Syndicate, which then controlled the electric lighting of the city of Wellington. On the termination of his engagement with this company Mr. Richardson entered the service of the tramway department of the Wellington Corporation and in 1905 was appointed tramway and electrical engineer, continuing in that position until his death.

**John Lewis Matson,** president of the Chicago & Interurban Traction Company and vice-president of the Hammond, Whiting & East Chicago Railway, died at his home in Chicago on Oct. 18, following an operation. Mr. Matson was forty-six years of age. He was born in Gottenborg, Sweden. He entered railway work as an apprentice in the general repair shops of the Illinois Central Railroad in Chicago, and in 1893 he was made assistant master mechanic of the South Side Elevated Railroad of Chicago. In 1902 he became superintendent of motive power of the Indiana Union Traction, and in 1905 resigned from the company to become superintendent of motive power of the Chicago & Milwaukee Electric Railroad. In 1906 he became associated with A. L. Drum & Company, and in 1907 was made manager of the South Chicago Street Railway, which was later consolidated with the Calumet Electric Street Railway, and now forms the Calumet & South Chicago Railway. In September, 1910, he was also elected vice-president of the Hammond, Whiting & East Chicago Railway. He was subsequently elected president of the Chicago & Interurban Traction, which operates between Chicago and Kankakee, Ill. Mr. Matson is survived by his widow.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## FRANCHISES

**Benicia, Cal.**—A. D. Bowen, representing the Benicia Land & Terminal Company, has received a franchise from the Council in Benicia. This is a part of a plan to build an electric line between Benicia and Vallejo. [E. R. J., Oct. 12, '14.]

**Los Angeles, Cal.**—The Los Angeles Railway Corporation has asked the Council for a franchise for a double-track line as an extension of the East First Street line into the Huntington hills, east of Boyle Heights.

***Los Angeles, Cal.**—The Glen Alta Improvement Association has asked the Council for a franchise to build an electric railway from the intersection of North Broadway and Pritchard Street to Hermon Street. Robert T. Hale and F. J. Whiffen are interested.

**San Lorenzo, Cal.**—The San Francisco-Oakland Terminal Railways has received a franchise from the Council to extend its railway in San Lorenzo in a straight line from the cemetery to the terminus.

***Lewiston, Idaho.**—R. C. Dahlheim and associates will ask the Council for a franchise to build an electric line in Lewiston. Application will also be made at once to the Council in Clarkston to build an electric line in Clarkston. This is part of a plan to build an electric railway to connect Lewiston and Clarkston.

**Pocatello, Idaho.**—J. D. Browning, representing the Pocatello Traction Company, has received a franchise from the Council in Pocatello. The terms of the franchise call for the construction of 1½ miles of track the first year and the same amount of mileage in each of the following years. [E. R. J., Sept. 5, '14.]

**Springfield, Ill.**—The Lee County Electric Railway has filed with the Illinois Public Utilities Commission an application for a certificate of convenience and necessity to construct a line from its present terminus in Bradford, Ill., northeasterly to Rochelle and from a point of connection with the present line, thence northerly to Ashton. The company is also petitioning for authority to issue stock for the acquisition of property and for the construction, extension and improvement of its facilities.

**New Orleans, La.**—The Orleans-Kenner Electric Railway has asked the Council for a franchise for a line from the upper Protection Levee to the center of the business district in University Place in New Orleans. This 110-mile line will connect New Orleans, Hanson City, Harriban and Shrewsbury. J. A. Bowman, New Orleans, president. [E. R. J., July 18, '14.]

**Amherst, Mass.**—The Holyoke Street Railway has asked the Council for a franchise in South Amherst near Potwin-lane.

**St. Peter, Minn.**—The Electric Short Line Railway has asked the Council for a franchise in St. Peter.

**Orange, N. J.**—The Public Service Railway has asked the Council for a franchise for the extension of the Central Avenue line through Orange to the Morris Street terminus of the Crosstown line.

**Tonawanda, N. Y.**—The International Railway and the city authorities have reached an agreement on the franchise to be granted the company to operate an electric line through Tonawanda over the right-of-way of the Frontier Electric Railway. In return for permission to operate the new line the International Railway will grant the city a 5-cent fare to Elmlawn Cemetery and restore the ticket system on the Kenmore line.

**Wilmington, N. C.**—The Wilmington-Carolina Beach Railway has received a franchise from the Council in Wilmington. This proposed 10-mile line will connect Wilmington and the Carolina Beaches. C. C. Chadbourne, Wilmington, president. [E. R. J., Aug. 22, '14.]

**Cornwall, Ont.**—The ratepayers of Cornwall have voted in favor of a by-law to grant the Cornwall Street Railway,

Light & Power Company a twenty-year extension of time on its franchise in Cornwall.

**Portland, Ore.**—The Portland & Oregon City Electric Railway will retain its recently secured franchise as granted by the City Council. The attempts of Commissioner Brewster to have the action of the Council rescinded have failed.

***Harrisburg, Pa.**—The Perkiomen Electric Transit Company has asked the Public Service Commission for a certificate of public convenience to build a 40-mile trackless trolley line along the public highway from Phoenixville to Emaus. James L. Wolcott, Dover, Del., president.

**Nashville, Tenn.**—The Nashville Traction Company has asked the Council for a franchise from the end of its Fifth Avenue line, at the corner of Mulberry Street and Fifth Avenue, across to Second Avenue and thence to Lafayette Street, there to connect with the line that has been built to the city limits at the junction of the Murfreesboro Pike and the Tennessee Central Railroad in Nashville. [E. R. J., Oct. 12, '14.]

**Snohomish, Wash.**—The Puget Sound Electric Railway has received a franchise from the Council to extend its lines to the main street in Snohomish. The franchise allows the company to terminate its line at Union Avenue and First Street, reaching this point by way of Fifth Street, Maple Street and Fourth Street, thence west on Fourth Street to Cedar Street and down Second Street to Union and First Street in Snohomish.

## TRACK AND ROADWAY

***Decatur, Ala.**—Plans are being contemplated to build an electric line to connect Decatur, Huntsville, Athens and Florence. Humphrey Read, Florence, is interested.

**Hot Springs (Ark.) Street Railway.**—Plans are being made by this company to extend its line to the golf club in Hot Springs. Through the efforts of Simon Cooper, Ernest Latta and W. O. Forbes, arrangements have been made with the local banks for the advancement of the necessary funds to build this extension. The general officers of the Public Utilities Company have been willing to make the improvement, but on account of the trouble at this time in securing capital found it difficult. With this arrangement made the work will be taken up at once in order to have the extension in operation by the opening of the season.

**Sacramento Valley Electric Railway, Willows, Cal.**—This company has placed in operation the first 12-mile unit of its railway which connects Dixon and Dixon Junction. Ultimately this line will be extended to Woodland, Willows, Corning and Red Bluff.

**San Francisco, Cal.**—Applications have been filed with the Board of Supervisors for the construction of twenty-eight branches of the Municipal Railway in San Francisco. These are in addition to the line for which a $3,000,000 bond was issued some months ago.

**Sausalito, Cal.**—The Marin County Electric Railways has asked the Railroad Commission for a certificate of public convenience and necessity to build an electric railway in Sausalito; to issue 150 shares of capital stock of a par value of $150,000, and permission to begin work on private funds during the time the sale of the stock is pending. [E. R. J., Oct. 12, '14.]

***Peoria, Ill.**—Estimates and preliminary surveys are being made to build an electric railway to connect Peoria and Washington, in Tazewell County. A. Black, Peoria, and W. H. Shott, Chicago, are interested.

**Bloomington & Normal Street Railway, Bloomington, Ill.**—M. G. Linn, superintendent of this company, states that grading and laying of new rails is contemplated preparatory to the pavement of Clinton Street between Emerson and Division Streets in Bloomington. It is the intention of the company to have the track in proper shape when the paving work is done.

**Kankakee & Urbana Traction Company, Urbana, Ill.**—This company is now laying 5 miles of new track between Rantoul and Ludlow. Cars will be running between Rantoul and Ludlow by Nov. 10. It is the intention of this company to build 5 miles of track next spring between Ludlow and Paxton, making in all 25 miles of track between Urbana and Paxton.

**Waukegan, Fox Lake & Western Railway, Waukegan, Ill.**—Plans are being considered by this company to double-track its line along Washington Street in Waukegan.

**Des Moines (Ia.) City Railway.**—Improvements are being planned by this company for its Center Street line in Des Moines. The line will be double-tracked as far as Twentieth Street and Clark Street.

**Union Traction Company, Anderson, Ind.**—Plans are being made by this company to build at once a new bridge over Greens Branch at Sixteenth Street in Anderson.

***Covington, Ind.**—The destruction by fire of a wooden bridge at Covington may delay the building of an interurban line from Danville, Ill., to Crawfordsville, Ind., intended to unite the Illinois Traction System with the network of Indiana and Ohio lines and to provide through service from St. Louis to Indianapolis, Louisville, Columbus, Cincinnati and many other points. It seems that one of the stumbling blocks in the construction of an interurban line from Danville to Crawfordsville was the expense of bridging the Wabash River. It is said that the Illinois Traction System has options on a right-of-way between Danville and Crawfordsville and that the company is to meet the officials of Warren and Fountain Counties and discuss what can be done in the way of a bridge to be mutually owned, the expense of construction being defrayed by the counties which are concerned and the company or companies involved.

**Arkansas Valley Interurban Railway, Wichita, Kan.**—A contract has been agreed upon by this company and the Hutchinson Street Railway for a connection giving the Arkansas Valley Interurban Railway an entry into Hutchinson. The Hutchinson Street Railway will be extended east 1 mile from the Larabee mill along what will be an extension of Avenue B, to the next section line 1 mile east, Halstead Avenue, south of the strawboard works. At this point the Arkansas Valley Interurban Railway will connect with the Hutchinson Street Railway coming in from Halstead and Burrton along the Santa Fé Railway.

**New Orleans Railway & Light Company, New Orleans, La.**—This company is asked to consider plans to build a new line from Poland Avenue in the Seventh Ward in New Orleans.

**Boston (Mass.) Elevated Railway.**—This company is asked to consider plans to extend its tracks in Boston from Summer Street over the viaduct to the Commonwealth fish piers, to Northern Avenue and on Northern to Atlantic Avenue.

**Fitchburg & Leominster Street Railway, Fitchburg, Mass.**—This company is asked to consider plans to extend its tracks to the fair grounds in Fitchburg.

**Union Street Railway, New Bedford, Mass.**—Plans are being made by this company to extend several of its lines in New Bedford. One proposition is to extend the tracks in Kempton Street from Summer Street east to Purchase Street.

**Berkshire Street Railway, Pittsfield, Mass.**—The extension from Blandford to Huntington, making a through line from East Lee, has been completed by this company and will soon be placed in operation.

**Detroit (Mich.) United Railway.**—This company is asked to consider plans to extend its Kercheval line to Connor's Creek Avenue in Detroit.

**Mesaba Railway, Virginia, Minn.**—Plans are under way by this company for an extension to Aurora. Work will be begun in the spring.

***Kansas City, Mo.**—Taking advantage of a special provision in the new electric railway franchise, the property owners in the Seventy-fifth Street district to be benefited have subscribed the money with which to build an electric line along Seventy-fifth Street from the state line to Broadway, where connection will be made with the Dodson extension of the Metropolitan Street Railway. Under the provisions of the franchise, the new line will be turned over to the Metropolitan Street Railway to operate under a lease for use of the tracks.

**United Railways, St. Louis, Mo.**—Plans are being considered by this company to build a line between Wellston and Lindenwood.

**St. John (N. B.) Street Railway.**—Work has been begun by this company on the extension to Marsh Road in St. John.

**Westchester Electric Railroad, Mount Vernon, N. Y.**—This company is considering the extension of its Mount Vernon-North Pelham line from its present terminal in North Pelham to the New York Central & Hudson River Railroad station in Tuckahoe. The route would lead along the public highways of Pelham and East Chester for about 2 miles.

**New Castle Electric Street Railway, Youngstown, Ohio.**—Plans are being made by this company to build more than 5 miles of extensions in New Castle.

**Brantford (Ont.) Street Railway.**—Work has been begun by this company on improvements to its lines in the east ward in Brantford.

***Guelph, Ont.**—Surveys are being made to build a hydro-electric radial railway between Guelph and Toronto, eventually to proceed through western Ontario.

**Peterborough (Ont.) Radial Railway.**—Work has been begun by this company on the construction of a branch in Peterborough to connect with the lines of the Canadian Pacific Railroad.

**Toronto Suburban Street Railway, Toronto Junction, Ont.**—The 12-mile extension to Woodbridge has been placed in operation by this company.

**Nashville (Tenn.) Traction Company.**—Construction work on the Shelby Avenue line in Nashville is progressing at the rate of one block a day, all necessary materials and equipment being on hand.

**Nueces Valley, Rio Grande & Gulf Railroad, Belleville, Tex.**—The 25-mile railway from Kitty along the Nueces River to Simmons and Live Oaks will be operated by steam and not by electricity. W. A. Malthaei, Belleville, president. [E. R. J., Nov. 15, '13.]

**Dallas (Tex.) Consolidated Electric Railway.**—The final contract has been signed for the extension of this line to the Southern Methodist University, and the Stone & Webster Engineering Corporation will begin work at once.

**Houston (Tex.) Electric Railway.**—Plans are being made by this company to double-track its line on Fannin Street and on Travis Street in Houston.

**McKinney, Bonham & Paris Interurban Railway, McKinney, Tex.**—Right-of-way is being obtained by this company in the vicinity of Brookston. A new line will be located from Honey Grove to Paris. L. A. Scott, president. [E. R. J., Oct. 3, '14.]

**Salt Lake & Utah Railroad, Salt Lake City, Utah.**—This company is extending its tracks on Academy Avenue from First North Street to Eighth North Street in Provo. It is the intention of the company to place in operation at once its lines now laid in Provo.

**Gray's Harbor Railway & Light Company, Aberdeen, Wash.**—It is reported that this company contemplates the extension of its tracks into North Aberdeen as far as Fernhill Cemetery. This could be done by extending a branch from the "B" Street line down Second Street and over the North Aberdeen Bridge or by connecting with the East Aberdeen line.

**Tacoma, Wash.**—The first definite steps toward the construction by the city of Tacoma of the tideflats line, for which $35,000 worth of utility bonds were ordered issued to the local banks recently, were taken when Commissioner Owen Woods closed the contract with the United States Steel Company for the purchase of 152 gross tons of steel rails. The rails will arrive this month, and the work of laying them will begin at once. The first bid calls for 118 gross tons of 70-lb. standard section Bessemer "T" rails. Another order includes 14 gross tone of "T" rails, in 30-ft. lengths. Talk of extending the tideflats line to the city limits at Sitcum Avenue, and the annexation soon by the city of the tideflats to the Bluffs, and the construction of the line to the east shore of the Bay, is being considered by the City Council. Mayor Fawcett indorses the proposition.

**Princeton (W. Va.) Power Company.**—Work has been begun by this company at the Princeton end of this company's proposed 12-mile electric railway between Princeton and Bluefield. [E. R. J., May 17, '14.]

**Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis.**—This company will award contracts to build its 1-mile extension to Mount Tom in the spring of 1915.

## SHOPS AND BUILDINGS

**Carmack Railway & Power Company, Opelika, Ala.**—Plans are being considered by this company to build its new carhouse and repair shops at Opelika. Fulton Pace, Opelika, chief engineer. [E. R. J., Oct. 3, '14.]

**Des Moines (Ia.) Railway.**—Plans are being considered by this company to build a new carhouse and repair shop on the river bank, at the present site of the interurban terminal in Des Moines.

**New Orleans Railway & Light Company, New Orleans, La.**—A new passenger station is being contemplated by this company on New Basin Canal at West End in New Orleans.

**Worcester Consolidated Street Railway, Worcester, Mass.**—Land has been leased by this company just west of Main Street, near the junction of Sterling Street and Main Street in Clinton on which the company has just built a new freight house. Plans are being considered by this company and the Fitchburg & Leominster Street Railway to build a union freight house in Leominster to be used by both the companies.

**Niagara Gorge Railroad, Niagara Falls, N. Y.**—This company has awarded a contract to the Turner Company, Buffalo, to build its new carhouse, repair and paint shop. The structure will be 156 ft. x 200 ft. and of tile and reinforced concrete construction.

**Cincinnati (Ohio) Traction Company.**—Plans are being considered by this company for the construction of a new building to be used as an interurban passenger station and which will provide for convention hall facilities on the second floor. It is contemplated to construct this building on the site of the old hospital in Cincinnati.

**Chattanooga (Tenn.) Traction Company.**—This company is soon to open a new station on its line at Crystal City, the name given to the new resort being constructed at the foot of Signal Mountain. This improvement is well under way, construction work on the 12-acre lake, for which extensive excavations were made, having been completed and work on the concrete spillway of the dam has begun.

**Texas Traction Company, Dallas, Tex.**—Work has been begun by this company on the new freight house for the new interurban depot which is being built in McKinney. The structure will be 40 ft. x 40 ft. and of brick construction. The passenger station will be erected at a later date in addition to this new building.

**Ogden (Utah) Rapid Transit Company.**—This company has awarded a contract to C. F. Dinsmore, Ogden, to build its new interurban passenger station on Twenty-fourth Street in Ogden. The structure will be 50 ft. x 270 ft. The cost is estimated to be about $25,000.

## POWER HOUSES AND SUBSTATIONS

**Carmack Railway & Power Company, Opelika, Ala.**—Plans are being made by this company to build a new power plant at Lake Carmack. H. A. Bedell, Opelika, president. [E. R. J., Oct. 3, '14.]

**Fort Dodge, Des Moines & Southern Railroad, Des Moines, Ia.**—Improvements and additions to cost more than $50,000 will be made on this company's power plant at Fraser.

**Topeka (Kan.) Railway.**—A. M. Patten, manager of this company, denied recently in an interview that the company was arranging to equip its old Second Street power house to supply itself with power. The report intimated that if the plant was so equipped the Edison Company would sell its equipment to the city. Mr. Patten said that the railway company was planning to use the Second Street building as a repair shop.

**Holyoke (Mass.) Street Railway.**—This company is now building its new power house in Mill Valley to be used for the Amherst and Suderland division.

**Brantford (Ont.) Railway.**—This company has purchased a Westinghouse 200-kw, twenty-five-cycle rotary for its power house in Brantford.

# Manufactures and Supplies

## ROLLING STOCK

**Stroudsburg (Pa.) Passenger Railway** has ordered one car body from The J. G. Brill Company.

**Spokane, Portland & Seattle Railway, Portland, Ore.,** has ordered one 70-ft. gas-electric car from the General Electric Company.

**Centralia & Central City Traction Company, Centralia, Ill.,** expects to purchase one pair of car trucks and two G. E. 54-A motors.

**Charleston (W. Va.) Traction Company** has ordered twelve double-truck city and suburban cars from the Cincinnati Car Company.

**Danville (Va.) Traction & Power Company,** noted in the ELECTRIC RAILWAY JOURNAL of Oct. 17 as having ordered two double truck pay-as-you-enter cars from the Southern Car Company, has specified that these cars will be built of T-iron construction, arched roof, St. Louis seats, Railway Utility Company's ventilators, Agasote ceiling and mahogany finish.

**Brantford (Ont.) Municipal Railway** has ordered six single-truck pay-as-you-enter cars from the Preston Car & Coach Company for delivery at the end of this year. The cars have steel underframes and are mounted on Taylor extra-heavy single trucks having an 8-ft. wheelbase. The cars are equipped with Westinghouse 101-B2 motors, K-10 controllers, Nuttall trolley bases, two Keystone illuminated signs per car, and Cleveland fare boxes.

**Boston (Mass.) Elevated Railway,** noted in the ELECTRIC RAILWAY JOURNAL of Oct. 17, 1914, as planning to send out this week specifications for a large number of trail cars, is in the market for from fifty to 100 trail cars for probable early use in the Boylston Street subway. The details of these cars have not yet been fully settled, but they will be of the center-entrance, prepayment type, weighing about 30,000 lb. each, and equipped with double trucks and a low step. The cars will be designed to operate in trains with the present No. 4 semi-convertible prepayment motor cars used on various subway and trunk lines.

## TRADE NOTES

**Walpole Tire & Rubber Company, Walpole, Mass.,** has appointed I. W. Penniman as Western sales manager. Mr. Penniman has charge of the Chicago office, located in the Brooks Building.

**Ohmer Fare Register Company, Dayton, Ohio,** on Oct. 7 distributed a large number of prizes among its employees for the best suggestions made during the past six months in regard to improvements in manufacture and for the welfare of its employees.

**G. D. Peters & Company, Ltd., London, England,** European correspondents of the Hale & Kilburn Company, announce that they supplied the seating material for the cars of the Constantinople (Turkey) Tramway, an article on which appeared in the Aug. 1, 1914, issue of the ELECTRIC RAILWAY JOURNAL.

**E. E. Brownell, Philadelphia,** consulting engineer, has been retained by the Memphis (Tenn.) Street Railway for about four years to supervise the installment of a mitigation system to prevent electrolysis of the water mains and pipes. The cost of the original installation will be approximately $1500, the railway company bearing the expense.

**Independent Pneumatic Tool Company, Chicago,** manufacturer of Thor pneumatic tools and electric drills, has appointed W. W. Robinson its representative in Michigan with headquarters at Detroit. F. J. Passino, the Michigan representative of the company, has been appointed to represent the company in the Southwest to succeed H. F. Finney, promoted to a position in the general sales office in Chicago.

**Van Dorn & Dutton Company, Cleveland, Ohio,** at a special meeting of its board of directors on Oct. 2, appointed H. H. Hodell, president of the Cleveland Galvanizing Works Company, and interested in several Cleveland enterprises, one of the founders of this company and for many years its vice-president, as president to succeed the late James H. Van Dorn. T. B. Van Dorn, now president of the Van Dorn Iron Works, Company, Cleveland, Ohio, was appointed vice-president to succeed Mr. Hodell. The active conduct of the company's affairs continues under the direction of F. W. Sinram, secretary and treasurer, and Franklin Schneider, manager and chief engineer.

**Electric Service Supplies Company, Philadelphia,** has been appointed exclusive selling agent of "Never Creep" anchors, manufactured by the Chance Manufacturing Company. These anchors are installed by boring a hole (preferably with an auger) at as near right angles to the line of strain as conditions will allow. The anchor rod is then forced down through solid earth, by driving, stopping the head of the rod about the center of the hole. After the anchor rod is installed, it is only necessary to lower the anchor plate into the hole, by means of a special tamping bar, engaging socket in plate with head of rod. The rod is then pulled up on and the anchor is ready for service. The anchoring of the rod in undisturbed earth renders impossible creeping of the anchor.

## ADVERTISING LITERATURE

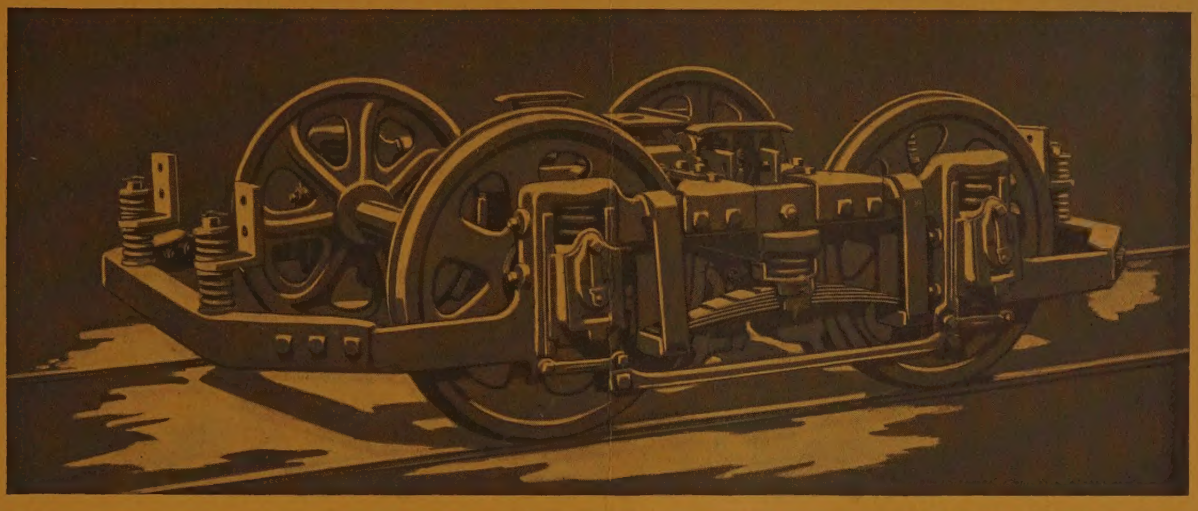
**Transmission Engineering Company, Pittsburgh, Pa.,** has issued a folder which contains illustrations of installations of its steel work for electrical requirements.

**Lutz-Webster Engineering Company, Inc., Philadelphia,** has issued Bulletin No. 4 which outlines the details of a prize contest which this company has offered to all mechanics, involving eighteen cash prizes, ranging from $100 to $5, for the best reports bringing out the points of highest merit of the tools manufactured by the company.

**Speer Carbon Company, St. Mary's Pa.,** has just issued a remarkably extensive book on carbon brushes under the designation of "Price List No. 7." The publication, however, not only contains such tabular matter as is necessary for ordering brushes, but also a great deal of data about the experiments which this company has made to perfect brushes for different kinds of service. Special attention is given to brushes for railway service including compressors. The tables show the brushes required for the oldest types of motors as well as for the latest commutating pole designs. The most instructive feature is the series of load curves which accompany the reference to each kind of brush.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.,** has issued a special catalog, No. 1552, outlining in general the progress which this company has made during the last year. The catalog contains brief and characteristic descriptions, accompanied by photographs, of electrical installations recently made on the following electric railways: Pennsylvania Railroad, Norfolk & Western Railway, New York, New Haven & Hartford Railroad, Long Island Railroad, New York Municipal Railway, Chicago Elevated Railways, Boston Elevated Railway, Niagara Junction Railway, Waterloo, Cedar Falls & Northern Railway, Sand Springs Railway, Connecticut Company, Youngstown & Ohio River Railroad, Lewisburg & Ronceverte Electric Railway, Salt Lake & Utah Railroad, Ogden Rapid Transit Company, Michigan United Traction Company, Oakland, Antioch & Eastern Railway, Kansas City, Clay County & St. Joseph Railway, Grand Rapids, Holland & Chicago Railway, Ohio Electric Railway, Northern Ohio Traction & Light Company, Wilkes-Barre Railway, Jersey Central Traction Company, Third Avenue Railway, Manhattan Bridge Three-Cent Fare Line, Municipal Railway of San Francisco, Cleveland (Ohio) Railway, Colorado Railway & Light Company, Northern Texas Traction Company, Public Service Railway, Charlotte (N. C.) Electric Company, Rio de Janeiro Tramway, Light & Power Company, Toledo, Fostoria & Findlay Railway, Omaha & Council Bluffs Street Railway, Panama Tramways, St. Paul Southern Electric Railway and Jamestown, Westfield & Northwestern Railway. Another special publication No. 1549 contains a number of interesting illustrations showing operating conditions in traffic centers of about thirty large American cities. Circular No. 1550 gives a detailed illustrated description of recent installations of this company's 1500-volt d.c. substation equipment. Circular No. 1546 contains a collection of illustrations, with brief notes, showing some of the advantages of multiple-unit trains.

# THE BRILL 76-E TRUCK



THE Brill 76-E truck has the new Graduated Spring System (patented) which is the most important development in truck construction in many years. It provides smooth riding for lightly loaded carbodies and practically eliminates wearing of parts. The end of the bolster is cast to form a cap for a coil spring interposed between the bolster and the semi-elliptic spring. This coil spring has a play of 3/8 in. between the casting in which the coil spring is seated and the bolster; when the car has between half and a full load of seated passengers, the spring action is entirely transferred to the semi-elliptics. By this means the minor shocks and vibrations, which would otherwise be communicated to the body through the semi-elliptics which are friction springs, and the journal springs whose action is dampened by the weight of the motors, are absorbed, resulting in singularly smooth riding. The large diameter of the bolster coil spring and the flat bearing of the ends of the semi-elliptics prevent side swaying. The fact that cars run "light" most of the time makes the Brill Graduated Spring System of great importance.

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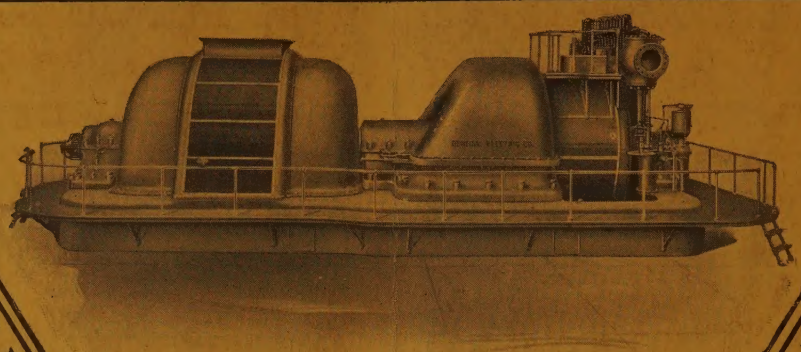

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